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ARMY INFORMATION DIGEST

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In This Issue:

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MEMORIAL TO A PATRIOT. On Armed Forces Day 1952, The James Forrestal Research Center was dedicated as a living monument to the first Secretary of Defense, who labored unceasingly to make unification of the services a reality. At the Center, basic research in advanced engineering will carry forward in the scientific sphere the same selfless inquiry which James Forrestal applied with considerable human understanding in military and governmental fields.

Research projects, present and future, are described by the Director of the Center in the lead article. As Secretary of Defense Robert A. Lovett pointed out in an address at the ceremonies, "The work which is done here will further the security of the United States to which Forrestal dedicated his time, his energy and his life."

DEFENSE KNOWS NO SEASON. While sweltering thousands seek to escape the summer's heat, efforts to bulwark our Far Northern defenses continue unrelentingly on the wind-swept tundras of the Arctic. There, despite vicissitudes of storm and cold, modern frontiersmen working with guns, radar and bulldozers are rendering the Northland secure against any threatened hostile action.

The activities of the Alaska National Guard, Air Weather Service and the Corps of Engineers are portrayed in three articles.

PRINCIPLES FOR FREE MEN. As part of the Sesquicentennial observance of the founding of the United States Military Academy, leading authorities in defense, information, industry and education were invited to deliver lectures on the significance of their fields to the national security. The challenging statements of the Chairman of the Joint Chiefs of Staff, the Editor of *The Christian Science Monitor* and the President of Brown University are extracted as being of special pertinence to all members of the Armed Forces.

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ARMY INFORMATION DIGEST

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U. S. Navy Photograph

THE HONORABLE JAMES FORRESTAL
SECRETARY OF DEFENSE, 1947-1949

THE JAMES FORRESTAL RESEARCH CENTER

PROFESSOR DANIEL SAYRE

NO MAN in public office did more for scientific research in this country than James Forrestal. First as Secretary of the Navy, then as Secretary of Defense, he created permanent governmental agencies sponsoring broad and continuing research in American universities and industry to insure our scientific leadership. Few understood better than he that fundamental research in the sciences was essential to the preservation of the Nation's safety and industrial supremacy. It was altogether fitting, therefore, that one of the great research laboratories of the country should be established in his memory.

In January 1951, Princeton University announced the establishment of The James Forrestal Research Center, for which it had acquired the extensive laboratory buildings built by the Rockefeller Institute for Medical Research on a tract of eight hundred acres adjacent to University property. In broadest terms, the new facility was to be used for the advancement of science and engineering and the high-level training of workers in these fields.

Since its establishment The James Forrestal Research Center has been devoted to the achievement of major objectives in the fields of chemistry, mathematics, physics and engineering. It has brought together eminent scientists and experienced research staffs to solve problems of prime importance to human knowledge, to industry and to the national security.

In specific and immediate terms, the Center has completed the organization of a wide program of basic research in the vital and related fields of fluid mechanics, combustion, chemical kinetics, advanced thermodynamics and applied mathematical analysis. Closely allied to these basic programs in pure science are a series of related programs in advanced engineering research. The most fully developed to date are those in the fields

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PROFESSOR DANIEL SAYRE is director of The James Forrestal Research Center of Princeton University.

of aeronautical engineering, jet propulsion engineering and chemical engineering.

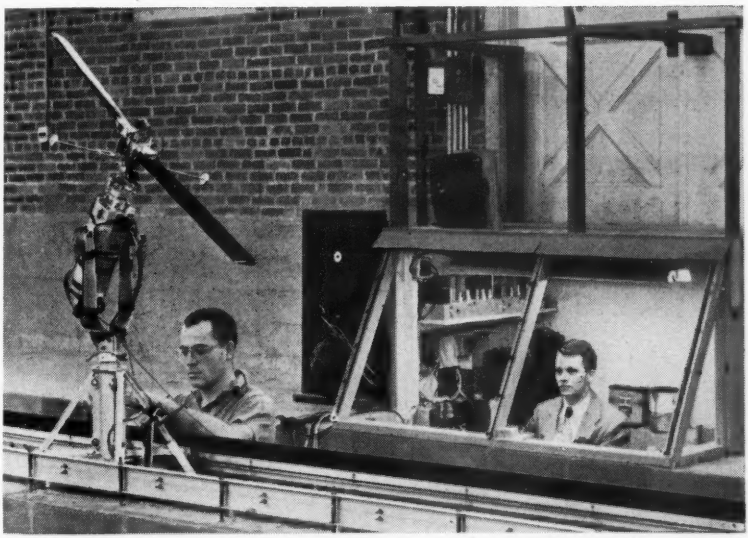
The Center has given first priority during the national emergency to research projects designated by governmental agencies as in the interests of national defense. During the next academic year it expects to carry out more than $1,500,000 of such research projects. Its areas of research, however, have been selected as of continuing value also to the advancement of human knowledge and peacetime industry. Sponsoring governmental agencies such as the Office of Naval Research, the Bureau of Aeronautics, the Air Research and Development Command, and the Atomic Energy Commission have fully recognized that such a research center can serve best in the advancement of fundamental science and the application of such science to general principles of engineering.

Three of the most striking developments of modern science and engineering, apparently unrelated, are: the swiftly widening application of chemical products to the satisfaction of human needs; the development of jet propulsion and the resulting advance of airplane speeds into supersonic velocities; and the first applications of the science of nuclear physics. Actually, there is the closest sort of scientific relationship between research programs dealing with high performance chemical processes, jet propulsion, supersonic flight and the application of nuclear science. Each of them involves the high speed flow of liquids or gases, critical problems of heat transfer, and factors of pressure and temperature. As a result, they share great common dependence upon the fundamental sciences of fluid mechanics, combustion, chemical kinetics and thermodynamics.

Because operations in each have progressed into areas of velocity, temperature and pressure, radically beyond the limits of such factors studied in previous decades, they have together "exhausted the stockpiles" of existing knowledge of such sciences. Moreover, most of these basic "flow sciences" have become intimately intermingled. Modern aerodynamics, for example, can no longer be separated from thermodynamics. Combustion rests largely upon gas dynamics and chemical kinetics. Chemical kinetics draws heavily upon fluid mechanics and thermodynamics and a knowledge of nuclear science. The science program at the Forrestal Center is designed to make a general attack across the broad front of all these fields.

Since 1944, a number of supersonic wind tunnels have been built in the United States and other countries. Many of them,

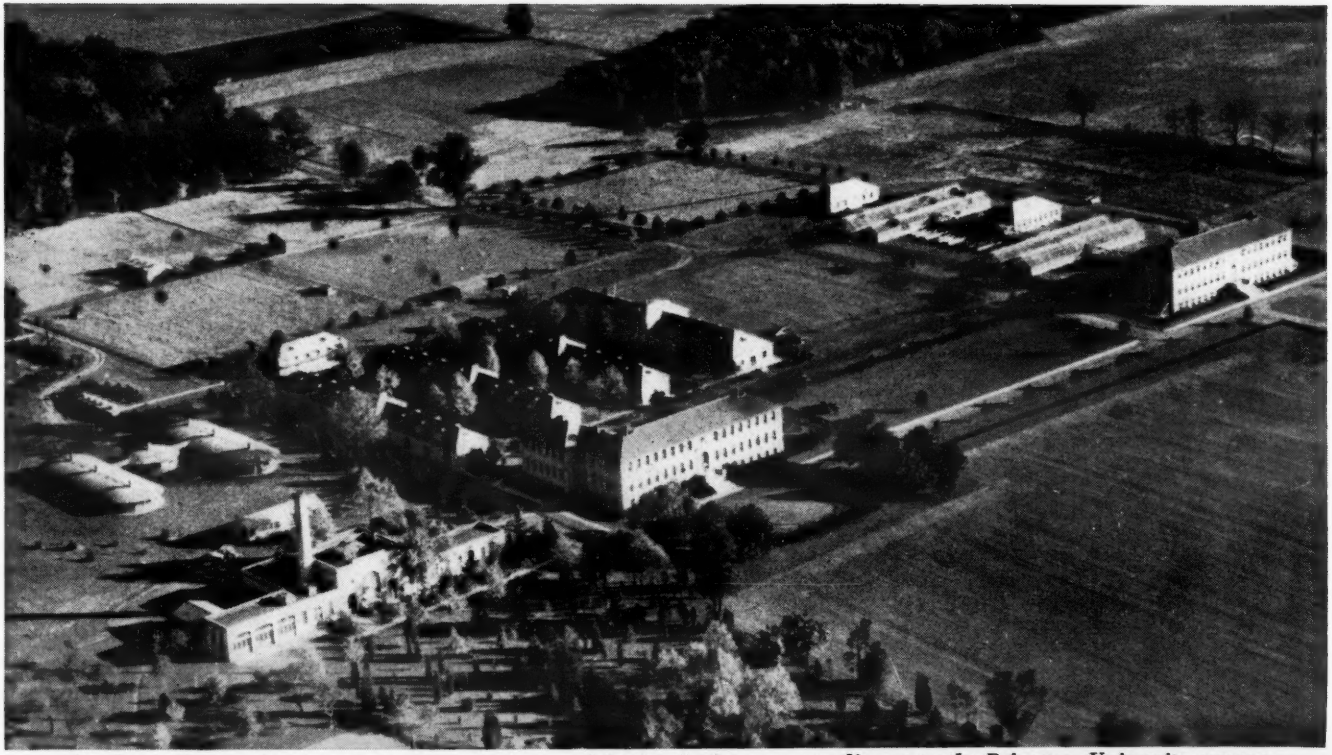
properly, were designed to yield forecasts of approximate accuracy of the performance of specific designs of supersonic aircraft and missiles. None of these, nor any of those proposed for purely scientific research, were suited to investigating fundamental problems of scale and viscosity when Princeton research scientists began their work. The result has been the development there of a unique group of three high precision wind tunnels which will become, in the summer of 1952, the backbone of the Forrestal Center's fluid mechanics laboratories. From them have already come the first organized explanation of certain serious deviations observed between predicted and measured performance in high speed ballistics.



In this laboratory, scientists concentrate on the critical problem of stability and control of helicopters. Elizabeth Menzies Photograph

At the end of World War II the Office of Naval Research, recognizing the importance of fundamental university research to jet propulsion progress, requested Princeton University not only to enlarge the scope of its own studies in that field but to establish an administration group to organize similar programs in other universities, the whole to be designated as Project Squid.

Today, Project Squid operates from the Center with concentration upon the basic science of high performance combustion. In addition to administering its programs at fifteen



The James Forrestal Research Center occupies an eight hundred acre tract adjacent to the Princeton University campus.

other laboratories, it serves as an ideal means of correlating the Forrestal Center's own work in this field with the total national effort.

The Forrestal Center's two principal current undertakings in combustion research are concerned with the fundamental relations between turbulence and combustion in high speed flow, and with the phenomena resulting from the mixing of supersonic and subsonic gas flows (the basic problem of ejector pumping, the ram-rocket and other devices).

In the area of chemistry, increased knowledge of chemical kinetics is of such importance to the defense program and industry that the Forrestal Center has undertaken as one of its principal tasks the organization of a laboratory planned to become one of the Nation's permanent foci of such research. Closely related to chemical kinetics is the study of chemical activity as affected by high voltage electrical discharge. Already well developed as a technique for the production of certain chemical compounds, this work is now being extended into an examination of its potential use in processing metallic ores.

No program for basic science would be complete if it did not include scientists in the areas of mathematical statistics and in mathematics, both pure and applied. In fact, the opportunity for scientists at the Forrestal Center to work intimately with mathematicians of higher caliber is one of the Center's strongest potential assets.

Already a major project combining various forms of mathematical and mathematical-statistical analysis, jointly sponsored by industry and government, is under way. In addition, a computation center, equipped with the latest devices, has been set up at the Center and provides substantial facilities in machine computation in support of many of the programs—chemical, physical and mathematical.

To realize the full potential of the initial program of basic scientific research at the Forrestal Center, the enlarged cooperation of the physical chemist, the chemical engineer, the physicist and the metallurgist will be required. The Center is developing a first class modern program of metallurgical research on the behavior of materials under conditions of severe stress whether of motion, pressure or temperature. Such a strong program should yield rich returns not only in new science but also in educated and research-trained personnel.

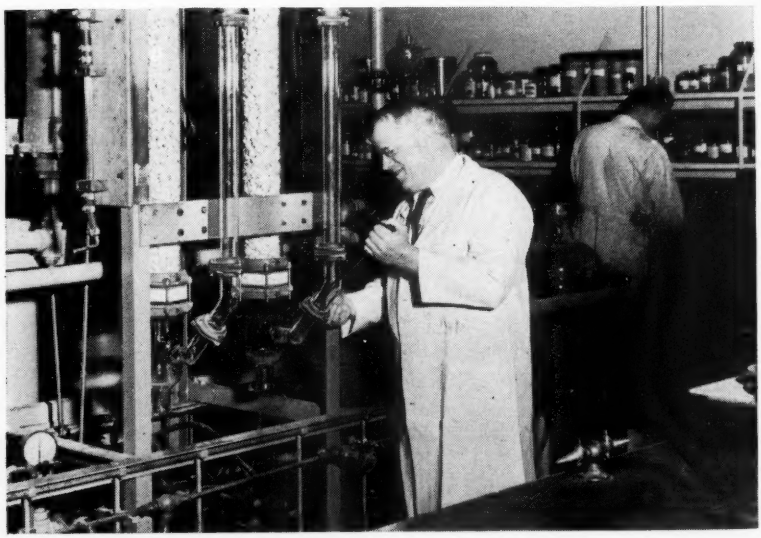
In the field of nuclear research, the range and magnitude of high-energy machines necessary to the exploration of the

The James Forrestal Research Center occupies an eight hundred acre tract adjacent to the Princeton University campus.

nucleus are such as to require funds which government alone can afford; nevertheless the Forrestal Center can provide the setting and the research facilities in which such high-energy tools can be serviced, and the work can be assisted by the corps of scientists in fields other than physics at the Center.

The engineering programs of greatest current development at the Center are those in aeronautical and jet propulsion engineering. The older of these two programs, that in applied aerodynamics and flight dynamics, is being expanded to include major projects related to the performance, stability and control of modern aircraft.

Actual flight tests have been added to the research process. Adjacent to the Forrestal laboratory buildings, an eight-acre landing strip provides adequate space for the flight-engineering study of moderate-sized aircraft. One immediate use of this facility is to round out a program of study in the critical problem of stability and control of helicopters. The availability of flight facilities now has permitted the organization of a program to correlate data from model studies with full-scale flight information. It is planned further to develop flight-testing techniques for the helicopter comparable in precision to those available for fixed-wing aircraft.



Studies in chemical kinetics are among the Forrestal Center projects important to industry and defense. Elizabeth Menzies Photograph

Another use of the airstrip will be to permit ultimate flight proving of basic principles now being studied in the subsonic wind tunnel. Intended to permit slower landing speeds and to produce improved flight efficiencies, the Forrestal Center study is an important part of a co-ordinated attack upon this problem recently organized at several university laboratories. Finally, the airstrip has made it possible to undertake the direct study of stabilizing and servo-control devices which have become so important in modern aircraft engineering.

The Forrestal Center's programs in high speed flow, combustion and chemical kinetics form an ideal background for fundamental research in jet propulsion engineering. Work was begun in this field at Princeton in 1947 with the development of laboratory work on rockets, ram-jets and pulse-jets. For this work, the Forrestal Center for the first time provides adequate test-pit, air-supply, shop and instrumentation facilities.

Two important problems of the widest potential importance are being analyzed. The first project represents the completion of several years of study of the possible advantages of the ducted rocket (sometimes called the ram-rocket) as a motor for manned aircraft or controlled atmospheric missiles of high supersonic speed. The second is to be a study of factors frequently producing irregular firing (chugging) in rocket motors.

As a memorial to the late James Forrestal, the Research Center epitomizes many of the qualities of the man. The distinguished commentator, Mr. Arthur Krock, aptly summarized this recently when he declared, "Scientific research was James Forrestal's intellectual passion, whether it was the study of human behavior, or the hidden sources of man's greatest mental and spiritual achievements, or how to create a tool of peace or a weapon of war more advanced and effective than any made before. No memorial to his public career could be as fitting as this one."

A snow compaction machine is used to prepare a temporary landing strip for aircraft. U. S. Army Photograph

U. S. Army Photograph

A snow compaction machine is used to prepare a temporary landing strip for aircraft.

ENGINEERS FACE THE ARCTIC

MAJOR ROBERT C. FAYLOR

Dates, places and personnel mentioned in this article are entirely fictional, but all operations, hazards, hardships and problems are based on practical situations encountered in the Far North.—Editor.

INCREASINGLY, the attention of the world is focused on the desolate wastes of the Arctic regions. Where once the North Pole was considered merely a geographic reference point in limitless wastes of water, ice and snow, today men of vision see it as a strategic nerve center—a bleak wilderness that must be studied and, so far as possible, harnessed if the way is to be cleared for its utilization as a defense outpost.

Some of the more common problems of pioneer construction work in the Arctic are exemplified in the following simulated but realistic situation. From the progress reports, supplemented by the written remarks of the colonel in charge, there emerges a picture of the tribulations besetting men and machines as they tackle the Arctic challenge.

MEMORANDUM FOR: Chief, Climatic Research and Test Branch, Fort Belvoir.

SUBJECT: Progress Report for Muskeg Airfield Test, Week Ending 6 November 1951.

1. Arrived yesterday by rail at Smithsville with advanced party. Spotted prefab buildings in place for unloading preparatory to building base camp, then proceeded to set up necessary buildings for shelter. Four cases of frostbite reported; none serious. Temperature —25° F. with heavy wind from NNE.

* * *

So ends more than a month of preparation for establishing the base. Orders were received on 1 October 1951 to prepare for movement of the entire group to the central Canadian Arctic.

MAJOR ROBERT C. FAYLOR, USAR, is Consultant, Research Branch, Research and Development Division, Office, Assistant Chief of Staff, G4, Department of the Army.

There we are to build an airfield to accommodate heavy bombers which might be forced to land while returning from missions over the North Pole.

Within a few days after receiving initial orders, our overall plans were mapped. Our jumping-off point at the end of the rail line is classified so we shall call it Smithsville. There we plan to set up camp, assemble supplies and acclimatize ourselves to life in the Arctic. By 15 January we are to send an advance detachment to the actual airfield site which is being selected now by a reconnaissance detachment.

An advance party will be flown to the site with sufficient equipment to build a temporary runway by packing the snow down with tractors. The main body then will fly in and establish a camp of prefab buildings and start construction of the big airstrip on a gravel moraine. This gravel job is to be ready for our support traffic and for limited operational use by June.

We departed by rail for Smithsville on 1 November, arrived yesterday and spent all day and night getting up our shelters. Although not actually in the Arctic, we had our first taste of battling the cold. We at once discovered that unless snow removal is properly handled and foundations made perfectly level, we could not get the buildings to fit together. Accomplishing this in the intense cold gave us a preview of the bitter battle ahead.

. . . Week Ending 13 November 1951

1. Train now completely unloaded. Only half our motorized equipment could be started, and this was used to drag the immobilized equipment off the cars.

* * *

This assignment appears to get tougher every day. Efficiency is low; no matter what time we try to get started working, it is almost noon before the equipment is in working order. Feeding the men is also a problem. We prepare meals in the mobile kitchen, then serve the men over the counter. By the time they get back to their bunks, the chow is frozen.

Much time and energy is spent in preventing equipment and machinery from being damaged by the cold. It is difficult to get the men to appreciate how swiftly water freezes at temperatures of —25°F and below. One water truck was almost lost because the driver went to supper and forgot to leave the truck heaters running. In a short while all the valves and much of the piping were frozen and the water in the tank was well along toward freezing. Fortunately we were able to take the vehicle

to a heated building in town. In the field such a mistake could be costly. We are all learning a swift respect for the cold.

. . . Week Ending 21 November

1. Storm which began Sunday stopped by Wednesday. Spent remainder of week digging out. We have learned three main lessons.

a. When a bad storm hits, stop working; nothing can be accomplished but expending men and equipment.

b. Buildings lined up in military fashion create snow drifts; we shall be forced to re-align entire camp.

c. Snow gets into everything; every effort must be made to make entire camp snow-tight.

* * *

We were totally unprepared for the effects of a real northern blizzard, although many of us had previously experienced these storms in cities or well established military camps. We quickly found that there was no use attempting to fight the untamed storm. Men became exhausted and equipment was immobilized by the penetrating snow that seeped into engines. The best thing to do, apparently, is just to wait it out, conserving energy and saving equipment. Digging out after the storm was a heavy task.

To avoid excessive snow drifts we have begun re-orienting our buildings and streets with the north wind, thus allowing the prevailing winds to blow directly down the streets; of course cross streets will be blocked, but at least we will be able to get to each building.

It was amazing the way that snow penetrated. All engine compartments were full of it, even those which were tightly closed. The fine particles had also worked into a demolition chest which we had considered securely sealed.

. . . Week Ending 27 November 1951

1. Indoctrination training started during week.

2. Three prefab buildings have been erected to make an expedient shop.

3. Equipment continues to arrive. Due to lack of shelter, it is being dispersed over the landscape. Have prepared maps showing locations in case another storm covers it.

* * *

With the completion of one shop building, much of our difficulty with equipment is more readily solved. We now can make repairs and maintain the machinery while the men devote themselves to indoctrination training. Individual efficiency increases daily. The incidence of frostbite is being reduced and morale is

on the upgrade. The next step in our mission will be to proceed to the site of the actual job. We should have a report from the reconnaissance party by the time we have completed setting up this camp.

. . . Week Ending 18 December 1951

1. Reconnaissance party reports they have established location of the airstrip on a moraine one hundred and ninety-seven miles northwest Smithsville. Am now preparing for advance party of five men to land at site by 1 January.

* * *

By the time the reconnaissance party reported, all construction and maintenance personnel had arrived at Smithsville. The entire group has been thoroughly indoctrinated; all buildings are up; the permanent camp is well established. Oddly the weather softened up following the blizzard to the comparative warmth of 0° F; and we have actually had melting snow on the lee side of buildings. The cold weather was an excellent preparation for the coming winter, however. Natives tell us that we will experience temperatures of —50° and —60° F.

The site of the airstrip we are to build is a moraine, a glacial gravel deposit about five miles long, fifty feet high and averaging two hundred feet wide at the base. It appears to be well drained but is surrounded by muskeg. There is a lake nearby on which we can land light aircraft. Plans now are being drawn up for landing men and for flying in heavy equipment after the deep snow is leveled. Christmas probably will be just another day as we push the work of preparing loads.

. . . Week Ending 5 January 1952

1. First wheeled cargo transport landed at airfield site on expedient runway. Build-up of camp and main shipment of supplies by air will start immediately.

* * *

Things appear to be moving swiftly now but we have had enough experience with the North to realize that it probably will fight us right along. The advance party of five men landed on the lake ice in a Norseman aircraft and established a temporary camp and radio communications on 1 January exactly as planned. They reported that the lake ice was thick enough for cargo aircraft but that snow was deep and would have to be leveled. A snow compaction machine was dropped by cargo parachute and the crew landed by Norseman aircraft on 2 January. A runway was prepared so that on 3 January an assault transport equipped with skis was able to land with two addi-

tional snow compaction machines and crews. The runway was rapidly enlarged, and today we were able to land the first wheeled cargo transport. Now the work of removing snow, digging gravel, putting the gravel down on top of the moraine, grading and smoothing it into a runway can begin.

. . . Week Ending 19 January 1952

1. Half of the unit has been moved to construction site. Prefab buildings have been erected. Build-up of supplies continuing.

2. Second gravel pit opened. Snow removal and control is major problem.

3. Water being obtained from under ice on lake.

* * *

Snow removal problems here differ from those faced in less frigid climates. Transport equipment cannot operate off-road or even on badly drifted roads. Snow removal must be planned so that the windrow does not form a snow fence which will create even greater drifts. Snow control and removal also are major problems in operating the gravel pits. First the snow must be removed in order to get at the pit and then again from the fill itself in order to prevent building up a high water content in the gravel. If gravel contains too much moisture it will affect the surface of the runway when thaws set in.

Moving the gravel and making cuts presents a tremendous quarrying problem. Some gravel can be worked by conventional methods in areas where it was well drained during the fall season. In other locations, drilling and digging the frozen material seem to be the only expedients.

. . . Week Ending 26 January 1952

1. We are digging out from another Arctic blizzard which stopped work most of the week.

a. Strict discipline must be enforced to prevent men from turning up stoves to highest possible setting and thus creating a fire hazard.

. . . Week Ending 9 February 1952

1. Work progressing slowly.

* * *

We have employed every conceivable method to start equipment engines and to begin our work early in the day. Engine heaters have started fires—fortunately none serious. Also these heaters occasionally go out during the night and let the equipment cool off. Too drastic pre-heating burns out the equipment

or causes breakdowns. Yet obviously we cannot run engines all night. Antifreeze loss is heavy due to leaks in our engine heating systems.

Intense cold is also causing iron and steel to become brittle and to break in use. High carbon steel cutting edges appear unable to stand the impact on frozen surfaces. The welder is always busy; we have found that we can weld at —40° F when absolutely necessary. In handling any sort of metal, men must wear protective gloves or mittens, which obviously makes work slow and difficult.

But batteries are giving greatest trouble. Cold batteries will not accept a charge and a battery which is not fully charged quickly freezes and breaks. Flying in replacement batteries cuts down the cargo space available for food.

. . . Week Ending 15 March 1952

1. Weather beginning to moderate slightly following weeks of intense cold and storms. Morale up but actual progress still remains slow.

* * *

After several bad storms, we now get an occasional day when the temperature rises nearly to the zero mark, but the ground

Tunnels through the snow give access to huts almost completely buried by the heavy drifts of the Arctic. U. S. Army Photograph

is still as hard as ever. Many of our buildings are entirely covered with snow and men go in and out via tunnels. However, we can begin to see some results of our hard work and in another month the runway should be shaping up.

. . . Week Ending 2 April 1952

1. Runway begins to emerge from the moraine. Snow is disappearing slowly although temperature has not been above freezing to date.

. . . Week Ending 26 April 1952

1. Gravel runway progressing well.
2. Expedient runway on lake shows signs of softening; equipment is road-bound due to softening and moistening of snow.

. . . Week Ending 17 May 1952

1. Lake runway closed but gravel runway has progressed sufficiently to allow landings by Norseman. Next week we should be able to land a C-47.

. . . Week Ending 31 May 1952

1. Bad pot holes appearing in the fill on gravel runway. We are working night and day to fill them.

* * *

Despite plans to have the gravel runway in shape to take a C-47, we discovered that great pot holes have appeared in the runway as the moisture, accumulated in the gravel, drained away. We are really road-bound now; tractors that get off the moraine become bogged down within their own length in the muskeg. However, as soon as we have the pot holes filled we should be able to land heavy planes.

. . . Week Ending 14 June 1952

1. Runway operational to C-47's.

* * *

It was a great day when we saw our first C-47 land. It brought in supplies and the first advance unit of the operations detachment. They will set up limited operations. Our main job appears very near to completion. We should be able to land a four engine aircraft very soon.

. . . Week Ending 28 June 1952

1. First four engine aircraft landed today. Runway is solid; all moisture out and pot holes packed down.

It is hard to believe, looking at our finished work, that the runway has not simply grown up out of the muskeg by some freak of nature and that all we had to do was to flatten off the top. Those landing here will hardly believe the heartaches that went into its making. While it still is not the best runway in the world, at least heavy bombers can get down and off again. The men are tired and ready for a rest. We have received orders to leave the summer construction to a replacement group.

We should be in Smithsville by Independence Day—the first holiday we have been able to celebrate, since we spent Thanksgiving, Christmas, New Year's and Easter on the job. We have been here for nine months. Sometimes it seemed all we could do to keep alive. But we did that and we did the job too. Now our on-the-spot experience—the ideas gleaned during these nine months of hardship—will go to work. Our day by day progress will be surveyed intensively by scientists at the Engineer Research and Development Laboratories to add to the Army's knowledge of Arctic ways so that those who follow will be even better prepared to meet the Arctic challenge.

Developing the strength we need does not mean building up limitless stockpiles of weapons that begin to be obsolete the moment they come off the assembly line. It means building up our productive potential—expanding our output of steel, aluminum, copper and other metals, developing substitutes for those that cannot be expanded, building new factories and power plants, tooling up facilities for mass production of military equipment in a sudden crisis, improving our communications and transportation systems, and sharpening the skills of our workers. In short, it means doing everything we know how to strengthen and expand our economy and prepare it for quick conversion to emergency needs.

The Honorable Robert A. Lovett

GUARDSMEN OF THE NORTH

MAJOR GENERAL RAYMOND H. FLEMING

TERRAIN, climate and personnel make the Alaska National Guard unique among United States military organizations preparing for their M-Day missions. Training grounds for these Guardsmen are the rugged, trackless Arctic wastes facing north toward the pole and west toward Siberia. This last frontier of America—home of the polar bear and the caribou—could be the first to feel the invader should unwanted war come.

Rigorous climate helps condition the Alaskan Guardsmen. The "tenderfoot" receives no sympathy from the ruthless extremes of Arctic weather. And every man is a tenderfoot if he is not a native or has not spent years acquiring the knowledge necessary for survival.

The Alaska National Guard—currently comprising two scout battalions and two separate infantry battalions—is unique in that it is the only component of the United States Armed Forces that includes Eskimo scout units. These hardy men of the North are reminiscent of the Indian scouts attached to the United States Army during the days when the western frontier was being opened. In this case, however, the natives are formed into units and are on duty around the clock every day in the year. Most are hunters, trappers and fishermen who live off the wild, frozen land. Included are Eskimos from scattered islands often isolated from the mainland through the long Arctic winter.

Personnel of Alaska's two scout battalions come from the western and northwestern sectors bordering the Bering Sea and the Arctic Ocean. Unlike their Stateside counterparts, these units do not meet once a week in local armories. Instead they are in the field, always on the lookout for unusual movements or incidents. Trained from childhood in the ways of outdoor life, they must be quick to note uncommon occurrences in the wilderness. Their lives may depend on keen observation. This inherent

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MAJOR GENERAL RAYMOND H. FLEMING, USA, is Chief, National Guard Bureau, Department of the Army.

ability makes the Eskimo a "natural" for frontier scout duties. He also is invaluable on rescue missions for regular forces stationed in the area.

Eskimo Guardsmen actually are on duty as they bait their traps or search out the caribou and the seal. In their villages, they drill as organized small units. Uniforms and equipment are kept readily available in their homes. Regular Army instructors on duty with the Guard reach these isolated scout units by air. Using planes of the Alaska Guard Air Section, they make periodic visits to the villages and Guard stations to conduct inspections, training and drills.

The Alaska Guard scouts carried out their first two weeks of field training in September 1951. Instead of assembling at a fixed site, two patrols were formed to reconnoiter several hundred miles of the Noatak and Kobuk Rivers north of the Arctic Circle. They had the mission of obtaining terrain data and of determining whether this type of field training would be feasible for future exercises.

To simplify administration of the two groups, a provisional detachment known as "Ronak" (Reconnaissance of Noatak and Kobuk) was organized. Selected personnel were named from each of the scout battalions to fill out the patrols and widen the training base among the lower units.

Each patrol, with its equipment and supplies, was moved by air from Kotzebue to the upper reaches of the rivers. They then proceeded downstream in life rafts powered by outboard motors furnished by the Air Force. Patrol members were equipped with the latest type arctic clothing and gear for testing under the severest conditions of terrain and climate.

Details of the navigability, depth of channel, speed of current and course of the rivers were recorded. The location and size of villages along the routes, types of native construction and climatic factors which might affect military operations also were noted. Army engineers later reported that the Eskimo Guardsmen demonstrated a natural aptitude for reconstructing and describing terrain features which they had seen.

Contingents of the Alaskan 1st and 2d Scout Battalions also joined in the first field training encampment of the 208th Infantry Battalion (Separate) at Camp Mendenhall Glacier early in December 1951. Scouts and infantry Guardsmen received intensive training under the most exacting field conditions. About fifty-five tons of equipment and provisions were transported over eight hundred miles of rail and water for the encampment.

Additional logistical support was provided by the Air Force.

Headquarters, United States Army, Alaska (USARAL) furnished field ranges, oil stoves, generators for lighting tents and for communication equipment. Signal specialists among the Guardsmen strung field wire from the camp to the Adjutant General's Office in Juneau fifteen miles distant.

The training site was located in difficult terrain, and living conditions were extremely rigorous. Yet enthusiasm and morale were high and attendance was excellent. Some 96 percent of the officers and 93 percent of the enlisted men took part.

Alaska's other separate infantry battalion—the 207th—underwent training in October 1951 at a specially prepared camp on the Fort Richardson reservation near Anchorage. Firing of the rifle, carbine, mortar and recoilless weapons, map reading, squad and platoon tactics, use and maintenance of equipment, and bridge building were among subjects included on the training schedule. Both infantry battalions repeated field training at Fort Richardson this spring.

Throughout their training, the Alaska National Guard units stress mountain and winter warfare. Co-operation with Regular Army forces in the protection of harbors, bridges, depots and communication lines is also emphasized.

The Alaska National Guard is faced with problems of logistics,

training and organization not experienced by other Guard organizations. Its vast area encompasses 586,400 square miles of territory—equal to the combined area of Texas, Louisiana, Mississippi, Alabama and Georgia with New Jersey and Connecticut added. Guardsmen are distributed over an area extending from Ketchican to Kotzebue. Units are deployed over a territory one fifth as large as the entire United States.

On 7 December 1941, the Alaska Guard consisted of a single infantry battalion inducted into Federal service only three months previously. During World War II, the Alaska Territorial Guard—comprised mainly of native Eskimo scouts—was organized and, after fulfilling its wartime mission, was disbanded early in 1947.

An Eskimo officer instructs his men in the operation of a walkie-talkie radio during field maneuvers at Camp Anchorage. U. S. Army Photograph

Subsequent world developments made increasingly apparent the need for re-establishing an Alaskan defense force. An office in charge of National Guard affairs was opened at Juneau in September 1948. An Acting Adjutant General of the Territory was named in November of that year. Later the Alaska legislature appropriated funds to support the new organization and thereby cleared the way for its re-establishment.

From the outset it was evident that organizational methods followed in the States would not apply to the special conditions

existing in Alaska. To meet the situation, two types of units were necessary—scout battalions to serve the western and northwestern coastal areas; and infantry battalions organized in various centers of population.

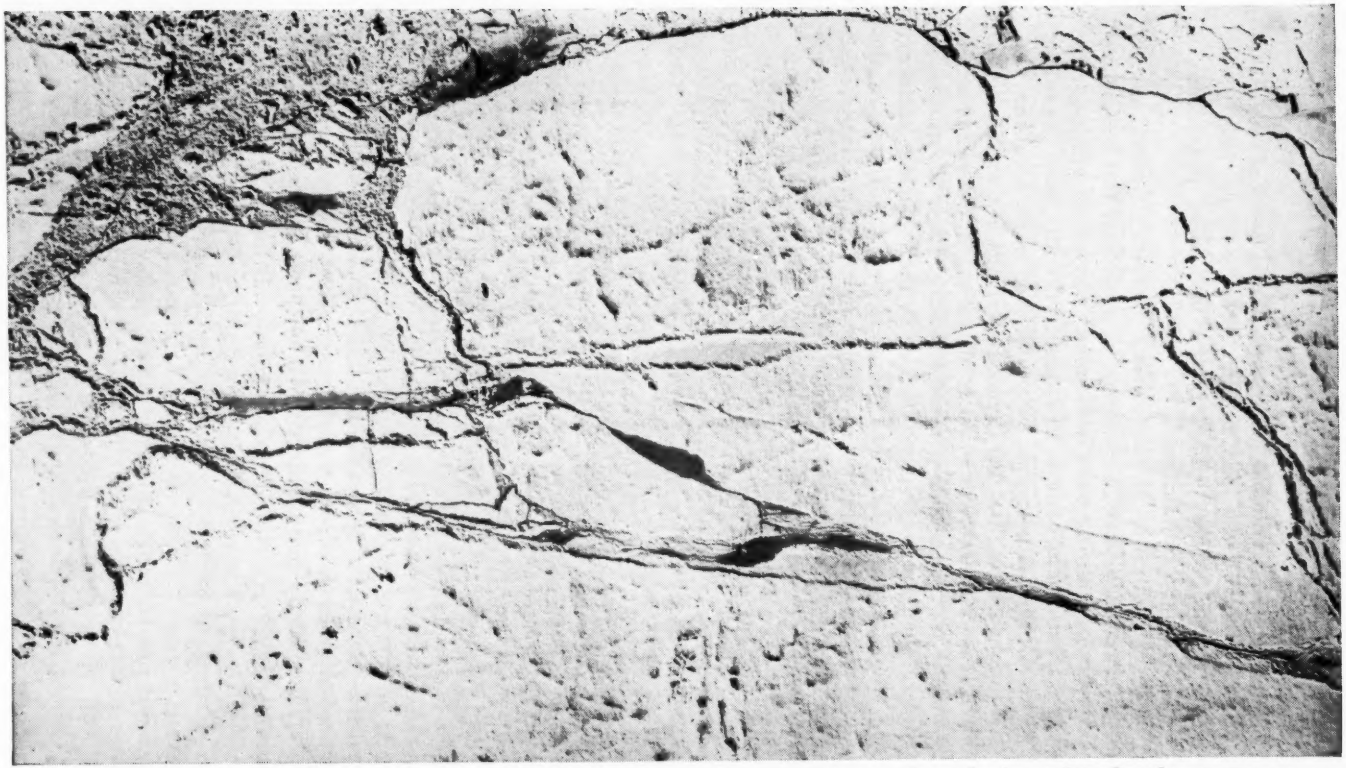
With the founding of the Alaska National Guard, supply depots were established, enlistment of personnel was begun and techniques of training were developed. Territorial headquarters began operations at Juneau in June 1949. Units were organized at Nome, Bethel, Anchorage, Fairbanks and other localities.

Headquarters for the two Scout Battalions are at Nome and Bethel. It is expected that when at full strength, personnel of the commands will exceed 85 percent Eskimos. Lack of knowledge of the English language is no barrier to their efficient training, since there are usually World War II veterans living in the various Eskimo villages who are willing interpreters. Enthusiasm for service is high among the natives and even those over-age are eager to join the local units.

The two separate infantry battalions are organized along the lines of similar units in the States. The 207th, "the Battalion of the Interior," has its headquarters at Anchorage and draws its personnel from the Anchorage and Fairbanks areas. The 208th, southeastern Alaska's "Island Army," has headquarters at Juneau, with many of its members from the "Panhandle" sector.

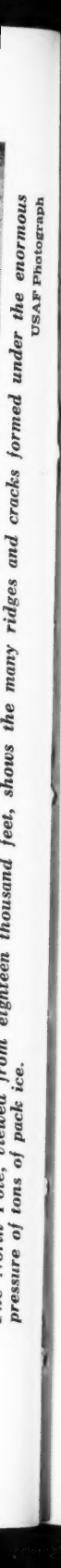
Although the youngest member of the re-organized post-war National Guard, the Alaskan units already have a solid basis of training and achievement. Officers of both infantry battalions are combat veterans of World War II. Last year Company B (of Sitka), a unit of the 208th Infantry Battalion, was awarded the Eisenhower Trophy in recognition of its outstanding progress in organization and training during 1950.

As an integral part of the National Guard of the United States and the Army, the Alaska National Guard is making a valuable contribution to the defense of that area. In so doing, it is helping to anchor firmly one of the pivotal outposts of security of the United States.



The North Pole, viewed from eighteen thousand feet, shows the many ridges and cracks formed under the enormous pressure of tons of pack ice.

USAF Photograph



pressure of tons of pack ice.

USAF Photograph

POLAR FLIER

MASTER SERGEANT JAMES K. BOSWOOD

WITNESSING three sunrises and three sunsets in a period of seventeen hours sounds impossible, but this phenomenon was experienced by men of the 58th Weather Reconnaissance Squadron who completed the first weather survey flight over the North Pole on 17 March 1947. The Squadron, based at Eielson Air Force Base, Fairbanks, Alaska, is the northernmost unit of Air Weather Service, a branch of Military Air Transport Service (MATS).

Weather reconnaissance planes of the 58th make the 3920-mile over-the-pole flight daily to collect data for use by weather stations throughout the world. The flight is named Ptarmigan.

Pilots of armed services aircraft depend to a great extent on MATS Flight Service for advice and information as to altitude and direction of flight, wind velocities and weather conditions along the general route of a projected flight path. Flight Service in turn relies heavily on up-to-date information furnished at regular intervals by Air Weather Service. The Alaskan sector of this Service, and more especially the Ptarmigan reports, thus contribute valuable information for flights which may be taking place thousands of miles from the North Pole. The same weather data, coupled with reports from United States and Canadian weather stations, have aided immeasurably in reducing storm damage to crops and property.

All-weather B-29's adapted for Arctic service are used on the flights. Cabin heaters, electrically heated windshields and blowers for warming the planes before take-off are all standard equipment on these aircraft. The ground temperature at Eielson AFB frequently drops to 40° below zero Fahrenheit and has been known to fall to the —60° mark. As a precautionary measure aircraft are not permitted to take off in weather colder than 40° below zero.

MASTER SERGEANT JAMES K. BOSWOOD, USAF, compiled a record of fifty-eight flights over the North Pole while on duty with the 58th Weather Reconnaissance Squadron. He is currently assigned to the 55th Weather Reconnaissance Squadron, McClellan Air Force Base, Sacramento, California.

Each plane is required to carry survival equipment and an allowance of two hundred and fifty pounds per man (including his own weight) is made. Included in this equipment are individual life rafts, Mae West life preservers, exposure suits, bomber bail-out kits and .22-caliber pistols.

Periodically Air Weather Service personnel are given survival training by being "abandoned" on an ice pack with standard survival equipment for periods ranging from a few hours to four days. They remain under the constant observation of an instructor who teaches them methods of constructing snow shelters, fishing through the ice, proper use of survival equipment and other tips to sustain life in the extreme cold.

Crews are taught to stay with the ship after an emergency landing on an ice pack. In addition to offering shelter, the bright red tail of the plane would prove invaluable in aiding search parties to find a fallen craft.

Navigation is a major problem in the Far North due to magnetic variations which may often be as high as 180°. Long twilights make navigation by "shooting" celestial bodies impossible. The merging of the longitudinal lines near the Pole presents still another hazard; however this has been solved by using a unique theory of grid navigation borrowed from the British. This theory is based on a series of evenly spaced lines constructed parallel to the Greenwich Meridian. To overcome navigational hazards peculiar to the Arctic, Ptarmigan navigators have improvised methods and, in some cases, have developed their own instruments.

In the spring of the year the first thaws occur. Although the ice never entirely disappears in the region of the polar ice cap, it does break up into floes. The first indication of the break-up is a series of cracks which, when viewed from eighteen thousand feet, look like long avenues or streets about five hundred feet wide. These cracks, or "leads," as they are commonly called, frequently come together when the wind shifts, causing huge pressure ridges.

The 58th is credited with the discovery of a floating ice island in the Arctic Ocean which has been recommended for use by the Air Force as a permanent weather station. The location of this island cannot be plotted accurately because it moves with the constantly changing currents and winds. About five to six miles across, the oval-shaped island's level surface makes it adaptable for an emergency landing field.

Crew members on the Ptarmigan flight seldom experience any

discomforts due to blizzards or rainstorms as they fly at an altitude well above these weather hazards. In the spring and fall they may witness the polar phenomenon of the Northern Lights—a spectacle which rarely occurs at other times of the year. This beautiful sight reminds one of a multi-lighted fountain with the spray shifting to and fro in an ever-changing pattern of colors. Otherwise, the round trip is one of great monotony, taking from seventeen to twenty hours.

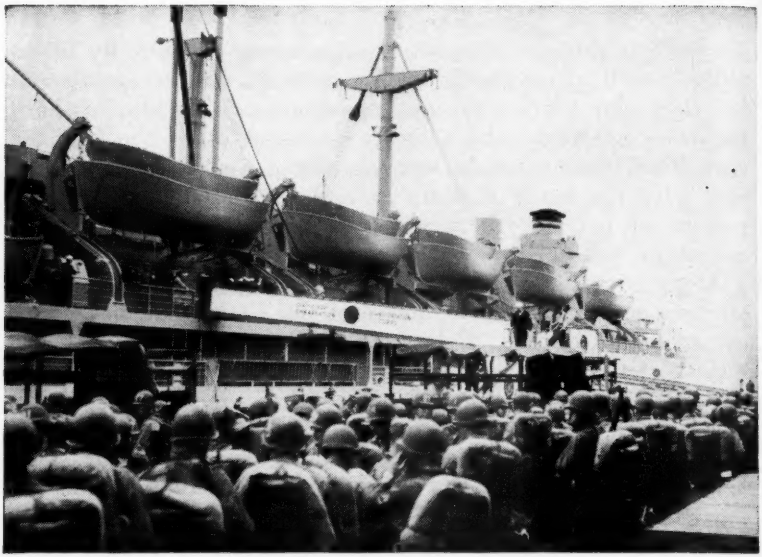
Along with Colonel Charles A. Lindbergh and other distinguished personages, all members of the Ptarmigan flight crew are members of the "Pole-Vaulters Club"—an exclusive fraternity of those who have flown over the North Pole.

On their regular trips Air Weather Service men are frequently called upon to drop flags and copies of publications over the Pole. Seemingly every newspaper and magazine that has published an article about the North Pole has requested that the particular issue be dropped on "top of the world." After the death of the pilot who had flown Admiral Richard E. Byrd over the Pole, the Admiral requested that a flag be dropped in the pilot's honor. These requests have been honored.

Many airmen and soldiers who have been stationed there like the Far North so much that they have built permanent type homes in or near Fairbanks where they intend to settle after completing their tours of duty. Because of the shortage of housing facilities in the Fairbanks area, newly assigned military personnel are finding a practical solution to this problem by bringing their own well-insulated house-trailers. There are several trailer courts in Fairbanks and trailer parking accommodations at Eielson and Ladd Air Force Bases.

Of course all is not as pleasant as in the United States, due to the extreme cold. In winter the earth freezes to a depth of four or more feet, causing water and sewage pipes to freeze. But on the other side of the ledger Alaska is a virtual paradise for hunters and fishermen. Caribou and other game abound.

Men in the Air Weather Service are ever conscious of the essential and necessary function they are performing both for their comrades-in-arms and for mankind in general. In spite of the obvious discomforts, veterans of the Ptarmagin flight volunteer repeatedly for this duty, and a friendly rivalry exists to see who can chalk up the most over-the-pole flights.



Troops with full combat equipment board a transport at the Seattle Port of Embarkation. U. S. Army Photograph

Soldier railroaders assigned to Transportation units move supplies by rail to troops in Korea. U. S. Army Photograph

TRANSPORTATION CORPS --A DECADE OF SERVICE

LIEUTENANT COLONEL GEORGE L. WILLEY

AN ARMY may travel on its stomach, as Napoleon is credited with stating, but the Army Transportation Corps—which celebrated the tenth anniversary of its establishment on 31 July 1952—now moves the Army, its food, ammunition and materiel, by every type of conveyance from truck to helicopter.

Many members of the Corps still recall the hot summer in 1942 when a small group of Army officers and their civilian assistants gathered in the Munitions Building in Washington to perform what many thought at the time was an impossible task. Their job was to organize a world-wide transportation network and also to recruit thousands of men and women skilled in specialized fields of transportation.

That was a stiff challenge, for already the United States had been at war for eight months and the great pools of available labor, equipment and materiel were being seriously depleted. But the task had to be done—and swiftly too.

How well it was done is demonstrated by the Corps' accomplishments not only during World War II but also in repatriating troops and materiel following the war, in supplying American commitments in far-flung corners of the world thereafter, and most recently by its performance in Korea. The past ten years have proved beyond doubt the need for military transportation planning and a standing organization to implement it.

Before establishment of the Transportation Corps, the Quartermaster General was responsible for transportation of men and materiel within the United States; he also had jurisdiction over the Army Transport Service and its small fleet of vessels. The Corps of Engineers was responsible for military railways. These activities were centralized during World War I and by the spring of 1919 all except motor transportation were con-

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LIEUTENANT COLONEL GEORGE L. WILLEY, Transportation Corps, is Technical Information Officer, Office of the Chief of Transportation, Department of the Army.

solidated into the Transportation Service, predecessor of today's Office of the Chief of Transportation. Following an attempt in 1920 to make this organization permanent, transportation functions again reverted to the Quartermaster General and the Corps of Engineers about as they had existed in 1917. In April 1941, a Transportation Branch was established on the General Staff G4 level. The March 1942 reorganization of the Army brought the Transportation Service under the Service of Supply (later renamed Army Service Forces). A separate Transportation Corps was established by directive on 31 July 1942 and finally, under the provisions of the Army Organization Act of 1950 (Public Law 581—81st Congress) it was made a permanent Army branch.

During World War II the Corps controlled the movement of troops and supplies via commercial carriers; it operated ports of embarkation in the United States, Army transport vessels of all types and Army ports and military railroads in oversea theaters. Shortly after World War II, the operation of highway truck units was transferred from the Quartermaster Corps to the Transportation Corps, thus placing responsibility for all surface transportation under the single office.

On 2 August 1949 the Secretary of Defense directed that responsibility for sea transportation for the three Departments be vested in the newly created Military Sea Transportation Service under direction and control of Department of the Navy. Responsibility for overland movement of Army personnel and cargoes, including operation of ports of embarkation and harbor craft and equipment, remained with the Transportation Corps.

Adequate transportation in war has always been a prime concern of the military commander. Lack of adequate facilities in early times restricted the size and movement of armies. The necessity for protecting supply routes frequently governed strategy; conversely, cutting the enemy's supply lines often forced him to cease operations. The American Civil War is sometimes called the first railroad war, since both armies relied heavily on rails for movement of troops and supplies.

The importance of transportation in modern war may well be illustrated by the activities of the fledgling Transportation Corps in World War II. In 1942, for instance, Army-owned utility railway equipment included 227 locomotives and 697 other types of rolling stock. By June 1945 this total had increased to 1476 steam, diesel and gas locomotives, 6782 cars of various types, 322 locomotive cranes, 85 auto railers and 759 pieces of maintenance-of-way equipment, mainly for use in more than three

hundred posts, camps and stations in the zone of interior. The Corps also operated more than twenty-five thousand miles of military railroads with trackage on every continent.

Every available means of transportation was employed in World War II—commercial railroads, trucking, water and air facilities. To meet Army needs, the Corps designed and built hundreds of special cars, including troop sleepers, hospital ward cars and kitchen cars. The Chief of Transportation had charge of eight major installations in the zone of interior and nine Zone Transportation Offices. Holding and Reconsignment Stations provided storage space while forty-eight open storage yards also were operated by the civilian railroads under Army contract. More than 7,290,000 soldiers and 126,787,875 measurement tons of cargo were transported overseas.

Moving mountains of materiel and millions of men to fight a war is not the sole mission, however. The Transportation Corps is among the first to start operations and the last to cease them when a state of emergency has been proclaimed or a war has been declared. When danger threatens, troops must be moved to assembly and training areas; food, equipment and supplies must be transported to distribution points. Following hostilities, the Corps must redeploy both men and materiel to and from the American bases world-wide. Even in peacetime, the Corps is among the country's largest movers of freight. In the fiscal years 1948 and 1949 some 19,500,000 long tons were moved within the United States alone while another 17,800,000 long tons were moved to or from oversea areas.

The Corps currently maintains offices and installations all over the world. In the zone of interior today there are five ports of embarkation—at New York, New Orleans, Norfolk, San Francisco and Seattle. Army-owned railroad maintenance shops are located near Baltimore, Maryland, and Ogden, Utah. A major depot is operated at Marietta, Pennsylvania. On the West Coast, a transportation section of Sharpe Army General Depot is located at Stockton, California. The Corps also conducts a Transportation Training Center and a Research and Development Station at Fort Eustis, Virginia. Its railway and highway equipment is widely dispersed at hundreds of posts, camps and stations throughout the country.

With the outbreak of the Korean conflict, units of the Corps were among the first to go into action in support of United Nations troops in the combat zone. The 8057th Provisional Transportation Port Company, rushed across the channel from

Japan to operate the port of Pusan, found antiquated equipment, inexperienced labor, and supply lines clogged with refugees. Rail and highway equipment was lacking and that which was available was in need of extensive repair. Language difficulties contributed to the complexity of the job. Nevertheless port facilities were expanded to receive and trans-ship thousands of tons of cargo and large numbers of personnel.

Repairing railroad yards bombed during World War II was one of many tasks performed by Transportation Corps personnel. U. S. Army Photograph

In the early phases of the Korean action, the tactical situation, for the first time since the Civil War, was directly supported by the railroads. With the enemy squeezing our troops into the small Pusan perimeter and with highways practically non-existent, all available railroads were pressed into service. At one time the 25th Division and attached units were moved by railroad from Waegwan one hundred miles to the Munsan vicinity and put in position to block the enemy—all in twenty-four hours.

When United Nations troops started moving north, rail and truck transportation became scarce. There was a lack of good highways; tunnels and railroad yards were bombed; traffic was curtailed by narrow, inaccessible highways and rough terrain.

With thousands of guerrillas operating behind the lines, Transportation Corps rail units were subjected to frequent armed attacks. Truck convoys were often raked by fire in moun-

tainous areas. Trains were shielded front and rear by sandbagged gondolas equipped with automatic guns.

To speed the flow of supplies, the Corps in conjunction with the Air Force set up terminals for the air shipment of priority cargo. The Corps is currently organizing and training Transportation Helicopter Companies to add to its flexibility in the field.

The ports of Chinnampo and Inchon were nightmares for Transportation men who were among the first to enter those devastated ports. Sunken ships blocked the harbors; buildings had been blasted to bits; cranes and other equipment were a tangled mass of rubble. Yet, together with Engineer troops, Transportation men rebuilt these places or found other means of keeping the freight moving.

Ruined ports were put in operation with the help of the famous amphibious vehicle, the DUKW. Amphibious Transportation Truck Companies moved cargo from ships anchored in the bay to areas as far as fifty miles inland, heretofore an unheard of operation for DUKWs. These vehicles also were called on for rear guard action; in 1950 they evacuated the last of our troops withdrawing after the bridges were blown.

Transportation personnel have been decorated for digging burning ammunition trains out of railroad tunnels, driving trucks over narrow roads under enemy guerrilla fire, rebuilding ports and railroads despite bombings, and moving exploding ammunition trains from railroad yards. These outstanding individual actions were incidental to the main task—speeding the movement of men and supplies to the fighting fronts.

Although the Transportation Corps was established on an emergency basis during World War II, it rapidly developed into a closely knit and well-run organization. But it was not until 1950 that the Corps was established on a firm legal basis. It grew to maturity in the period when unification of the military services was being resolved.

In spite of its turbulent beginnings and the discouraging climate in which it had to grow, the Transportation Corps in the brief span of a single decade has attained full development, meanwhile winning for itself a reputation for accomplishment as the Army's versatile mover of men and materiel.

A Message to ARMY INFORMATION DIGEST on the West Point Sesquicentennial Celebration from the Superintendent, United States Military Academy

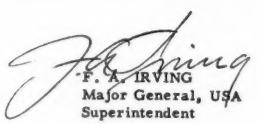
Now that the Class of 1952, our Sesquicentennial Class, has been graduated from the Military Academy, we can look in retrospect upon the celebration of the one hundred and fiftieth anniversary of the founding of this national institution.

First of all, I should like to express publicly my appreciation to those who made the celebration a success. The entire staff of the Academy added to their regular duties the extra time and effort necessary to plan and execute the various official functions. The celebration, however, would not have been successful without the active participation of so many American and foreign learned societies, universities and colleges, of military organizations and institutions, and of governmental agencies.

The high point of the celebration was, naturally, the Jubilee Convocation on 20 May, with the main address given by The President of the United States. However, addresses of such outstanding Americans as Governor Thomas E. Dewey of New York; Secretary of the Army Frank Pace, Jr., General of the Army Omar N. Bradley; General J. Lawton Collins; General Hoyt S. Vandenberg; Dr. Karl Compton, Chairman of the Corporation of Massachusetts Institute of Technology; and others contributed greatly to the importance of all the events.

We at West Point hope that the celebration of our Sesquicentennial has provided a sounding board for these leaders of our Nation to express, not only to those present, but to the American people, ideas which are vital to us all today. If we have accomplished this, then our celebration has been successful.

This Sesquicentennial year, during which we have examined the West Point of the past and its accomplishments, has also afforded us an opportunity to pause and look to the future. As we reflect upon the deeds of our graduates in every war in which the Nation has been involved since 1802 and upon their accomplishments during the intervening periods of peace, we must resolve to continue to instill the ideals of Duty, Honor, Country, which have been our code throughout the past one hundred and fifty years, and re-dedicate ourselves to improving this national institution.



F. A. IRVING
Major General, USA
Superintendent

LEADERSHIP TRAINING AND NATIONAL SECURITY

GENERAL OF THE ARMY OMAR N. BRADLEY

TO PREVENT a war if possible, or to win it if it occurs—this is the future task of our Nation's military leaders.

In his preventive role, the soldier must have the education, the scope of imagination and the background of knowledge that allow him to perform his role in the military area of policy determination. We must provide "cold war" soldiers as well as battlefield commanders and planners. For today, in this half-peace, half-war, neither the soldier nor the diplomat alone can lead our people in a wise course of international action.

The responsibility of the military in the determination of foreign and domestic policy is to furnish advice to the civil authorities on the military implications of particular courses of action. The Department of Defense does not determine foreign policy. Its responsibility is to plan for any military eventuality, and this includes continuous analysis of our military capabilities and the military implications of actions which have been taken or which may be taken. These analyses are taken into consideration in conjunction with political, economic and psychological factors when a policy determination is finally made.

There have been cases in which the military factors have been considered more important than the political, economic or psychological. On the other hand, there have been situations in which the political considerations have been overriding. The soldier's task is to further the diplomat's daily accomplishment, and both the statesmen and the people need the wise counsel of intelligent and trained military men.

In the second task—to win the war if we cannot deter aggression—the military must play a predominant role. Even in this job we need the combined civilian-military outlook. The soldier must not direct the civilian policy but neither must the civilian overcommit the soldier. We must never have a policy that sends our Armed Forces to world tasks beyond their capabilities.

From an address delivered at the United States Military Academy.

In preventing war, the influence of modern technology—especially in the atomic field—can be a deterrent power. It has been up until now. But science and research are not weapons for us alone. They can easily be weapons for the aggressor also. When a potential enemy achieves relative strength in atomic and other untried weapons, the deterrent effect of our atomic capabilities diminishes.

Science has made war complex. The men who fight it must have the education to handle the weapons and the instruments they have been given. To meet the requirements of modern combat, the Army officer must have a sound technical education, for he must be able to supervise the control and maintenance of many new weapons as well as to direct their employment.

Modern technology certainly affects our strategy and our tactics; through its application we hope to win any future war at less cost in lives and materials. But it has still left an important role for the front-line soldier and it has enlarged the role that our air power can play.

A good working knowledge of the various fields of science will be necessary to relate the latest scientific discoveries to our military problems. If we are to receive the best that our scientists and engineers can provide for winning war, the Army and Air Force officers, especially in the technical services, must have technical training beyond that which the United States Military Academy can provide. Furthermore, our technical services may have to alter their procedures so that more of the problems of invention and research and development are turned over to our civilian scientists and engineers. I believe that we are going to have a better chance of winning the industrial and scientific race with the Soviet Union if we make even greater use of the research laboratory and the engineers of industry, thus tapping the broadest knowledge and experience our Nation can provide.

The professional military man needs more education to handle the new weapons that science has given him. To insure success in a future war, the modern soldier is faced with the necessity of being properly educated. Otherwise he risks the catastrophe resulting from ignorance.

The needs of national security impose on education a twofold requirement of locating first-rate men, capable of technical and scientific proficiency, who will be the scientists and engineers of the future; and secondly, training the broad cross-section of our manpower to handle capably today's and tomorrow's scientific developments.

The impact of science on the military art demands that our colleges produce more and better scientists and engineers. But the extensive military use of new scientific development makes it mandatory that our entire cross-section of manpower—who will eventually be the soldiers, the sailors and the airmen to handle radar, radio and atomic energy—must have some technical education. Their training must start in our high schools and even in our elementary schools.

Wars are won not alone by the bravery of soldiers and the quality of their leadership, but also by the mass and the quality of the material provided by the nation. *Battles* are won by the infantry, the armor, the artillery and the air teams, by soldiers living in the rain and huddling in the snow. But *wars* are won by the great strength of a nation—the soldier *and* the civilian working together.

Modern war is a work war, a war of detailed planning, of specialized equipment, of long hours of drudgery, while still a war of courage and of death. The advent of the machine has made war the total conflict that it is. Nations, not armies, go to war. In preparing for a lifetime of service, our professionally trained military graduates must train not only for leadership in battle, but also to provide leadership for the Nation in adapting the resources of science and education to our national needs.

To win any future war, military men will also have to take the lead in applying thrift to our use of resources and our scientific achievements. We must lead the Nation in application of science—and also in the prevention of waste—as we apply the discoveries of research and development to the military art.

The military services, especially during wartime, have need for first-rate men. In many instances we are going to have to compromise our needs to allow the first-rate man to stay with science and with industry. We are going to have to be harsh and arbitrary in our judgment between first- and second-rate men. In some instances we are going to have to take problems away from the man who has only a mediocre ability and rely on the better man. But this problem is not insoluble. It leads to the challenge that education must face. We must have in the future of education a method of developing more first-rate men.

When we are working with Americans in uniform, we must remember that the soldier and the sailor and the airman are not born in uniform. They come from civilian origins. Their natures are formed in civilian molds. The character of our civilian society will in a large degree determine the character

of our fighting forces, which reflect the spirit of inventiveness and initiative that is America. Officers train their men not only to obey but to be able to initiate action for themselves in those confused moments of emergency that occur so often in battle.

The greatest leader in the world could never win a campaign unless he understood the men he had to lead. Part of the mission of all of our service schools is to develop—in order that it may spread throughout our Armed Forces—the kind of leadership best suited to a growing nation made up of honest, patriotic and rugged individualists.

Military organizations and success in battle depend upon discipline and a high sense of honor. These are the greatest attributes leadership training can give to our Armed Forces.

Some might regard our preoccupation with education as out of keeping with the realities of the world situation today. But education, in the long run, may be our salvation. Neither the present rate of mobilization nor the future strength of our Armed Forces is as important to our long-range security as the proper application of education to national security.

When we survey the contribution of modern industrial know-how to our military effectiveness, we must remember one significant point: *Men without weapons in modern war are helpless, but weapons without men are nothing.* A machine cannot think. A machine cannot replace the fighting will to preserve our American way of life.

Education and our own Christian living must give us control over the inventions of science. With the monstrous weapons man already has, humanity is in danger of being trapped in this world by its moral adolescence. Our knowledge of science has clearly outstripped our international capacity to control it. In one sense the world has too many men of science, too few men of God.

Today we know more about war than we know about peace. To fulfill completely the obligation to his country, the American soldier of the future must be a crusader for peace in the truest sense of the word—a crusader who hopes to prevent war and to bring about the security that this Nation, with other free men, can ultimately wrest from Communism.

COMMUNICATIONS MEDIA AND NATIONAL SECURITY

ERWIN D. CANHAM

THE security of our Nation depends upon two kinds of protection. One kind is physical; the other is moral. In both of these interrelated areas, the job of the press and other media of information is necessary and essential.

All of the instruments of freedom in today's world—newspapers and other media of information among them—need reclarification. The flood of words that submerges us—words in the press, words shouted or insinuated over microphones, words in books and words in magazines, words in pamphlets and broadsheets, and words on the political rostrum—too often conceal the ideas which alone can save us in the Twentieth Century.

What are these ideas which we need to reclarify and think through again?

The first idea is that man in our day—fearless, resourceful, thinking man—has freed himself more fully from enslavement by nature and material environment than at any earlier time in human history. This progress in relationship between man and his natural environment has accelerated by leaps and bounds. In the last half century we have made more progress in freeing man from material limitations than in all the previous years of human history put together.

The next idea is that this free system is the true revolution in human history. We in the free world—or the world that is trying to be free—are the ones who are dedicated to the constant daily challenge of the status quo. But they who fall into totalitarianism are bound by chains of dogma and imprisoned by the closed mind.

Another idea for study and dissemination by our media of information is that even the capitalist system, in the last quarter of a century, added a new dimension of co-operation and inte-

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ERWIN D. CANHAM is Editor of The Christian Science Monitor. *The opinions expressed are those of the author and do not necessarily represent official views of the Department of Defense or any of its agencies.*

gration based upon our remarkable and little understood system of voluntary private organization.

If free society is to survive, it is necessary for individuals and institutions to awaken and to mobilize in a world-wide campaign to spread some comprehension of the facts of this free system and to close the still-yawning gap between our ideals and their accomplishment.

And finally, the last of the ideas is that the kind of society of which we are a part owes all that it has become and can ever hope to be, to a conscious awareness of and obedience to fundamental principles or laws of cosmic order which most men rightly call God.

We are living at one of the turning points of human history. Either the world will move in the direction of more freedom or less freedom; either we will strengthen and broaden—here and elsewhere—the political, economic and social institutions of representative government, or we will strengthen authoritarianism and the big state. The conflict in direction is manifest everywhere in the world. What can we Americans do about it as individuals, and what can we do about it collectively; more specifically, what can the instruments of information do about it?

It is my thesis that within free society as it is manifested here in our land, we have already evolved the basic institutions that can preserve freedom but that we do not know what we have done. Still less have we communicated this achievement to other peoples. We have the machinery of communication but we have not yet learned what it is that we may say.

It seems to me that we should realize more precisely ourselves, and communicate to others, the exact nature of the vast hoax that Communism and other forms of totalitarianism have perpetrated on much of mankind. The biggest of totalitarianism's big lies is the belief that we are doomed to the defense of the status quo as reactionaries and that Communism, or other police state forms, is dedicated to change, to revolution.

The fact is that Communism, like totalitarianism of the right as well as of the left, is plain old-fashioned reaction. In its essence, since it says that man must be subordinated and enslaved to the state, it is a tyranny no different from all the dictators who have existed since the dawn of society. No police state ever sets man free. Totalitarianism does not liberate. But the system of which we are a part is most emphatically based on the rights of man; it *does* liberate.

Above all, our system is not shackled to the status quo. Our

enterprisers are continually asking, as a matter of course and a condition of survival, if there are not better ways to do tomorrow the tasks they are carrying out today. We must refuse to accept dogmatism and the closed mind. If we are to be saved, our society and our means of communication must make perfectly clear to us that we will pull ourselves through these places just to the degree that our minds remain open to criticism, to analysis, to challenge, to improvement.

We therefore ought to proclaim ourselves to the world as the true revolutionaries of today's society. And yet by our own failures to understand and to communicate, we have let the vast majority of the world fall into the delusion that we are doomed to maintain and support things merely as they are. We have temporarily lost the battle of songs and of slogans and of manifestoes; and yet manifestoes are still implicit in our system. The Declaration of Independence and President Lincoln's Gettysburg speech are among the greatest manifestoes of history. Even Wilson's Fourteen Points and the Roosevelt-Churchill Four Freedoms were capable of moving men, and did. But, of course, manifestoes are not enough. We were forced to compromise the principles of the Fourteen Points and the Four Freedoms. Our acts were not consistent with our words. And we lost those battles for men's minds, or largely lost them.

But this time we must win. We have come to a crisis—a turning point.

The task of the means of information is to proclaim anew the truths we live by, so that we may convert our words into deeds. If we are to declare anew the true revolution of humankind, let us carry it out. The fact is, of course, that we are carrying it out in part every day. Scarcely anywhere else in the world today can men of diverse races and religions enjoy as much freedom and opportunity as is available here. But it is not good enough, and it will be—it must be—better tomorrow.

Communism is a potent export doctrine. The free system ought to be. We should make available to other nations and other peoples the essential elements of our system which can be turned to their use. The process of "making available" is another of the primary functions of the media of communication and information. Of course we should never fall into the illusion of thinking that we should attempt to make others over into our image. Neither the political nor the economic systems which we use are perfectly adapted to the needs of people with other experiences, other traditions, other aptitudes and disciplines.

And yet they need the essence of representative institutions and of an operative free economic system, adapted to their needs and experience.

In broad terms, therefore, I believe the best contribution the press and other media of information could make to our national security would be to help awaken Americans to the kind of moral and practical leadership we can exert in the world. The first necessity is to understand more clearly than ever that we and our friends in today's world are the true revolutionaries, that we are not shackled to the status quo, that we are the co-heirs of a system which genuinely strikes off chains.

The relationship between the instruments of information and the people have changed fundamentally in the last half century. Today nearly every American newspaper, unlike nearly every American newspaper of the previous century, has to speak to a general and diversified audience—to the total community—and not to a tightly integrated group. To such an audience, a newspaper has to introduce large elements of reader interest and entertainment and moreover it has to speak with some measure of news objectivity.

On both counts, there is difficulty. The quest for maximum reader interest leads to over-sensationalism. You have to do your utmost to make news so interesting that it will get into the largest possible number of minds. And yet, it is difficult to get people to read a story about, say, the failure of the rice crop in Indo-China. Nevertheless such a remote event might mean peace or war, stability or chaos, tragedy or happiness, to a great number of American homes.

A piece of technical military information is not always easy to make clear and fascinating to a great mass audience. The more you popularize and brighten up such a piece of technical information, the more likely you are to be inaccurate and unsound. Journalism is in many ways a constant daily compromise between what is interesting and what is important.

Nothing we print or nothing we say is of the slightest value until it interests somebody else's mind, until it is read, until it becomes a part of the thinking of the persons to whom it is addressed. We should not be supercilious about the concessions and compromises which have to be made in order to get facts into more people's minds. The broad problem that the instruments of information face today is very much the same problem that we face because our entire society has been raised to a level where general education presents brand new problems—far dif-

ferent from those that existed when the elite had a monopoly of access to the means of education and to much of the media of information. I do not take the simple view that, by diffusing and adulterating the content of our message, we have made surrenders and unworthy concessions.

Newspapers do not own the right of press freedom. It belongs to the people. Newspapers and radio are merely stewards. But the retention of freedom depends upon a better discharge of that stewardship.

Newspapers are frequently urged to follow the example of bar associations and medical associations and set up self-licensing systems. But any license, even though it be imposed by other newspaper men, is repressive and intolerable in the field of ideas. The battle for freedom has to be made on behalf of the worst, rather than on behalf of the best. I believe that if the great press martyrs of the past—the great spokesmen for the free word—had been required to obtain a license from a majority of their colleagues, they would have been suppressed before they started. Great ideas are not necessarily popular. Unorthodoxy is often the key to true freedom.

But we can expect and must demand improvement through the acceptance of voluntary responsibility, spurred by a steady flow of invigorating criticism. Moreover, the citizen holds a decisive whiphand over newspapers any time he wishes to exercise it. It is the money which he does—or does not—drop on the newsstand counter. This is not a perfect and total control. It can veto, but it cannot necessarily bring about improvement. Indirectly, it tends to do so. It is one, at least, of the final tests.

An endless task lies ahead of us all—it is the task of keeping people alert to the constant dangers to freedom; the task of helping them to understand the effectiveness and the revolutionary character of the institutions of freedom we already have; the need of challenging the status quo and accepting the duty of doing more effectively tomorrow the tasks we perform today.

A first and indispensable necessity for national security is physical strength, both in terms of armament and in terms of economic and political stability. But physical strength alone will not create the fundmentals of peace, any more than a police force creates order. It is the final, necessary enforcing agency. But peace, or order, depends upon the acceptance by the community of the desirability of order and co-operation in its attainment. Therefore, behind what we are building in our world in these years, behind this barricade of a strongly armed West, we

must go forward with a deeper reaching, more fundamental security program.

There are many divergent opinions about the essential elements in this program, but on the following points most would agree. There must be the largest possible degree of co-ordination of the diplomatic, military and economic policies of the free world; a maximum effort to decrease the poverty and increase the standards of living of the less economically developed parts of the world; much more effective communication to man everywhere of the achievements and the potentialities of free society; concrete steps to eliminate the gap between the avowals and the practices of the free world, thus establishing its sound faith and so helping to replace cynicism with confidence and with hope.

The material and spiritual resources of the free world are very great. When all of us accustom our minds to the problems we face, there is no reason why we should not go forward successfully to preserve our free institutions; to stabilize the basis of our economic, political and social life; and to help the world into a more fruitful time.

Every American needs to understand, as our forebears understood in the early days of this country, that the survival of America cannot be taken for granted. It is a most cherished possession—inherited from our forefathers. It is something to fight for if it is in jeopardy, and the Armed Forces are justifiably proud of the part they have played throughout our history, in its defense and preservation. *General Lemuel C. Shepherd, Jr.*
Commandant, United States Marine Corps

EDUCATION AND NATIONAL SECURITY

DR. HENRY M. WRISTON

CLAUSEWITZ' famous dictum should be constantly borne in mind: "War is nothing but a continuation of political activities with other means intermingled. . . . Political activities are not stopped by the war . . . but are substantially continuous." The soldier does not fulfill his whole function unless he is conscious of that fact and fully competent for its realization.

The day of fighting for glory is long gone; the day of struggle for empire is surely over. Indeed, the day of battle for anything except the right to live our own life is largely past. If that is the legitimate occasion for war, we must know precisely what our own life is, what it should and can be, how its goals can be attained. At the same time we must discover how our ideals square with the aims and practices of the rest of the world.

That is a large order, particularly for the United States. Understanding is difficult because, prior to modern transportation and communication, this Nation had an isolated situation between two oceans with secure boundaries to the north and south. Among the consequences of isolation was neglect in mastering foreign languages. The linguistic barrier to understanding is serious. It not only makes current dealings tediously slow and difficult; it also limits appreciation of cultures older than ours, fully as rich and as proud.

Comprehending others is made more difficult because we have become stronger while other nations have weakened either actually or relatively. Any alteration in traditional balances is irritating to the nation suffering disadvantage. What a strong nation regards as a suggestion may seem more like an ultimatum to a weaker one.

Moreover, the United States is unique in many respects. Our differences from others are more significant than our similari-

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DR. HENRY M. WRISTON is President of Brown University. The opinions expressed are those of the author and do not necessarily represent official views of the Department of Defense or any of its agencies.

ties to them. That makes full confidence between us and others even more difficult. It requires more patience, more learning, more imagination, more wisdom.

To see how distinctive is our aim, examine a dollar bill. One side shows the Great Seal of the United States bearing the words "*Novus Ordo Seclorum*"—a new order of the world—or, translated more freely, a brave new world. That motto was not chosen by over-modest men. Its adoption reflected a deep inner conviction about the destiny of our Nation. We consciously promoted revolutionary ideas, upsetting the old order so that a new and, as we believed, a better one could replace it.

Never before in history had men been born free of class, caste, social status; complete absence of such fixity was indeed a new order in the world. It was an idea so radical, so revolutionary that after nearly two centuries we can still hardly comprehend it. Nevertheless the principle so infected the minds of men that kings by divine right have disappeared; orders of nobility are vanishing; slavery has been abolished the world around; even the ancient caste system of India is crumbling. An acute critic well said, "The Declaration of Independence blew Europe off its moral base." We set out to supply a new and better one.

The fruit of our egalitarian philosophy was universal suffrage and democracy. In no other land mass with such contrasts in terrain, range of climate, variety of racial stocks and diversification in occupations is the policy of government controlled by democratic processes. That also is, in sober truth, a new order in the world. Never before in history and at no other place in the world has a government of continental size, actively controlled by public opinion, faced issues so great in scale and scope or so complex as those that confront the United States today.

Even in our foreign relations public opinion is dominant, for there is no American tradition that excludes international affairs from popular control. Our foreign policy—sometimes referred to as "shirt-sleeve diplomacy"—is not the product or the possession of an elite; it is an instrument of public opinion.

Effective democracy requires a citizenry who will cling to and promote our distinctive way of life. Our key ideals are valid not for ourselves alone but for all men. We should not hesitate to preach what we practice, as we are in honor bound to practice what we preach.

We have a vast interest in the integration of Europe and

view with enthusiasm such projects as the Schuman Plan and the European army. In fact, anything that tends to curb sovereignty in Europe and to create a larger unit, sometimes referred to as the "United States of Europe," evokes great enthusiasm. On the other hand we do not want to join too closely with others. Apparently we are more interested in integrating others than in integration with them. From our standpoint we are maintaining our independence, while their behavior often seems to us to be mere stubbornness.

It is elementary that in order to win men's minds we must appreciate their standards of value and we must comprehend the order of priority they have established among the good things of life; both may be different from our own. Only disciplined effort will enable us to understand what people of other races, languages, religions and traditions hold dear.

The naive assumption that dollars alone will cure "backwardness" is dangerous. Understanding is more difficult than subsidizing. Indeed the larger the appropriations the more difficult becomes the problem; because the vaster the expenditure, the more we appear to seek dominance. Subsidies alone do not make a solid foundation for international relations.

Cordial international relations, it should be clear, depend upon something far more complicated than large appropriations, the passage of sound commercial legislation by Congress, the development of fair trade practices by business, the exercise of fiscal wisdom by the Treasury, courteous diplomacy on the part of the State Department, and the preparedness of the Armed Forces. All these are necessary, but in addition all must work in balanced harmony; public opinion must be alert to each of those elements all the time.

To the current demoralization of public opinion through frustration must be added its confusion and partial paralysis through fear. The most superficial knowledge of psychology—individual or social—reveals that fear in its acute form induces paralysis. It leads not to rational and wise action, not to courageous performance of the acts necessary to meet the situation, but to inaction or to irrational outbursts.

Unless we substitute prudence for terror as the spur to action, we shall have assaulted the inner core of our being and the source of our wisdom. The first step should be a re-awakening of confidence. The public should be given some measure of awareness that the things which terrify us today are no worse, relative to our capacity to deal with them, than past dilemmas.

After World War I, memories of poison gas and the emergence of the airplane led to predictions that the striking power of an aggressor nation would be so formidable that it would be victorious in a very brief time; yet we all know World War II was longer than World War I. Current prophets of doom who assert that civilization will be wiped out in the next war are propagators of fear based upon relatively superficial causes for terror; they neglect the more profound dynamics of human history. Knowledge of the past would show the same predictions following every great advance in destructive weapons.

Did those earlier fears lead us to wise and vigorous action in order to prevent World War II? On the contrary they caused the abandonment of victory and a search for an unattainable isolation. They resulted in wholly unrealistic economics about the war debts and reparations. They led us to underestimate the dangers in the rise of Fascism and Nazism. The negative consequences of fear have never been better illustrated.

Excessive fear fosters retreat from responsibility. For instance, it is frequently claimed that the next war will not require many soldiers because it will be a "push-button war." Actually it takes more men and more brains to manage the button than for hand-to-hand combat. Before the button is ready to push, there are enormous technical, scientific and other problems to be solved; and before you decide to push the button, there are even greater moral issues to be faced.

Those things being so, what can education do to further the security of the Nation? How does one set about designing a program to educate for the kind of world in which we must live out our lives? It must be admitted that there is confusion on this point. So much energy has been spent in perfecting specific techniques that inadequate attention has been paid to a coherent design for the whole.

A philosopher offers a key to the puzzle. In *The Aims of Education and Other Essays*, Alfred North Whitehead gave a hint so basic that it is almost never mentioned; nevertheless it furnishes the text for all I have to say. He used four short words as the criterion for education: "The students are alive."

Life's great adventure lies in steadily extending the range of observation, deepening the sense of awareness, filling in the pattern of meaning, not alone during the period of youth but throughout the whole of life. That provides ever fresh experiences of mind and body; one becomes more and more alive—more sensitive to what occurs in the world, more alert to beauty,

more perceptive of significance, more sympathetic, more wise.

It is lack of faith in the aliveness of students that leads to over-accent on vocation, to excessive emphasis upon mere training, to an everlasting routine which desensitizes young people instead of making them more alert.

Contrast the position of an American student today with youth in most of Asia. Human life in the Orient means very little for the reason that it holds very little. Born to abject poverty with no prospect of rising above the margin of subsistence, tied to the land with no hope of escape, equipped with no ideas except those which were inherited, a person has little to live for. Such a man does not cling to life with the tenacity of those who are privileged to see its potentialities; in the struggle for survival, others wipe out his life with callousness. In America, however, we may find life zestful and rich; we may deal with it in broader and more significant terms than those who have not had the opportunities for intellectual development, social mobility and spiritual growth, and all the other advantages which have been opened to us.

It is especially tragic that our education should largely be dominated by techniques, that students should be indoctrinated, that skills alone should be trained, that men should too often be dealt with substantially as if they were machines. When these things are done, should we be surprised that so much stress is laid upon how much more accurate, how much more dependable, how much better than human are the "memories" of electronic monsters? The emphasis should be reversed in order to point out how clever are the men who create them and build into them such extraordinarily life-like qualities that the machines seem more alive than many products of an education which fails to remember that "the students are alive."

In an effort to become "expert" in one field many students restrict their zones of sensitivity to such an extent as not to participate in the rest of life to the limit of their potentialities. The man who gains vast technical proficiency at the cost of spiritual dullness, esthetic blindness or ethical insensitivity is not fully alive. In a calculated way he is reducing himself toward the level of mechanism. Anyone who does not strive to develop all his powers—physical, mental, spiritual and esthetic—has, to that extent, failed to remember that he is alive.

We would pity a man with no memory. He would daily be discovering what ought to be obvious; he would puzzle his wits over things which should be done from mere habit. In

modern society he would be helpless. Similarly, a man with no memory but of his own experience has a very limited basis for action. Unfamiliar with the forces that shaped the problems with which he has to deal, his approach is naive. Only through supplementing memory by vicariously entering upon the experiences of others can a person reduce the number of baffling situations in which he finds himself.

Memory, lengthened sufficiently by knowledge of earlier experience, supplies at least an analogue to almost every intellectual, moral, social and political dilemma which confronts us. Life's potential has been infinitely extended by the resources of historical scholarship. It reveals the experiences of ancient times; it clarifies the ways in which earlier people dealt with problems still insistent today, especially those of the ethical and moral life and the relationship of the citizen to politics. In convenient form we have readily at hand not only our own accumulated knowledge but that of many who have preceded us. We do not have to grope our way blindly through unfamiliar circumstances, but can chart a course by what we know others did in comparable circumstances.

Everyone who is fully alive—intellectually, emotionally, spiritually—finds the world so entrancing, life's adventure so thrilling, that his curiosity is insatiable. To him nothing seems wholly foreign; practically everything gains "relevance." Instead of constantly rejecting subjects on the ground that they do not hold any personal appeal, charm is found in more and more ideas. By reflection they are formed into a coherent pattern within the mind. Such comprehensive knowledge helps to banish fear. The wider one makes his area of informed interest, the more competent he is to meet what must be faced with courage and clarity of mind.

There is no reason to restrict the concept that students are alive to the physical and intellectual life; indeed, to do so would be a tragic mistake. The emotions are as capable of cultivation as are mind and body. Emotion brings us news as significant, truth as valid, and experience as real as any revealed by the intellect. Indeed the highest emotion of all, love, is the foundation for the religion to which most of us adhere. All the forces which drive us are emotional in character even though the intellect supplies the light and power.

Harmony of intellect, emotion and physical well-being makes life a great adventure. Disharmony results in undue tension, and our time has been called, not so much the atomic era, as

the age of the barbiturates. Neuroses do not arise so much from excessive work as from disharmony and disorganization.

Conscious of unhealthy tension, men seek avenues of escape. Escape from what? Escape from reality—that is, escape from living. So many men bore themselves with the incredible inanities of mass entertainment, or turn exclusively to murder mysteries. Others take to alcohol or narcotics, seeking oblivion.

There are available compensatory activities which are not escapist. They serve to expand life instead of encouraging us to run away from it. There is room—indeed, there is need—for the constant refreshment of one's sense of humor. It is essential to proper perspective; and it is not only legitimate, it is wise, to take time for its cultivation.

There are many forms of recreation—physical and mental—which promote sound health and which help in the attainment of that reasonable sense of proportion which the Greeks established as the ultimate good. Among these is literature, through which it is possible to enter into the imaginatively created experiences of others and thus broaden perceptions of the meaning of life and savor its great adventure. Poetry has a charm all its own; as it becomes a familiar companion its deepest values emerge. Still another form of enrichment is music. Or looking at the fine arts may so stir one to esthetic awareness that thereafter all beauty has more significance. For the arts speak an international language and have a timeless quality.

None of these things needs to be passively received; one may undertake, as an amateur, to write, to paint, to play or to compose. Such efforts sharpen the outlook upon the work of others and add richness to appreciation. Any fresh and diverting physical, intellectual or emotional activity can withdraw a person's attention from his labors and cares; thus, even in relaxing, he can deepen and enrich his experience.

For human beings creative opportunities are almost infinite in variety. Every idea is an invention, if it is really an idea and not a mere parroting of someone else's thought. Each time the imagination evokes an image capable of realization by whatever skill, it is an act of creation, a manifestation of life. Creative power does not stem from skill; its origin is in imagination which itself is capable of disciplined development. Of course it requires skill to translate what the mind has conceived, but skill without imagination is sterile.

In an electronic calculator an idea is only a datum—cold, hard, non-malleable—to be "stored" in an appropriate tube

against the time when it is summoned. But if the student and the idea are both alive, their interaction upon each other is a unique occurrence in the history of the world. For no two living people were ever alike and no two ever responded to the same idea in precisely the same way; the possibilities therefore are, in the most literal sense of the word, infinite.

To what conclusion does this reasoning lead? America proclaimed a revolutionary doctrine—all men have an equal right to life, liberty and the pursuit of happiness. That faith shaped the course of our history and gave us moral leadership in the struggle for freedom.

After World War I disillusionment and economic depression combined to drain away much of the passionate confidence which had marked our faith. The initiative passed to the totalitarians; and during the last quarter century the rights of men were curbed rather than expanded. After the defeat of Fascism and Nazism, Communism alone challenged democracy. That challenge has not yet been fully met.

Industrial energy revived before moral and political confidence returned. The United States led the world in a technological revolution of amazing proportions. The productivity of our economy upset the historic balance of the world. It furnished support for war-weakened nations and inspired them with fresh hope. At the same time its dominant size awakened fears lest instability here carry all the free world down in another crash like that of two decades ago. The situation illustrated the paradox incisively defined by Ortega y Gasset: "superior to other times, [but] inferior to itself"; "strong, indeed, and at the same time uncertain of its destiny; proud of its strength and at the same time fearing it."

From those doubts and fears we must escape. The United States must recapture the intellectual and moral initiative in the struggle for "a new order of the world." Without that, mere "situations of strength" will prove sterile. In that recovery education, in the true meaning of the term, has a vital role.

We must make available to every competent American not only training in skills and a growing mastery over nature. In addition to those essentials, we must cultivate far more intensively the discipline of the humanities and the social studies. By their help we may obtain our fullest potentialities as men. That is the only path to leadership in the world's quest for peace and freedom. The future security of the Nation rests with students who are alive.

ARMY ACCENT ON LANGUAGES

AUGUSTUS A. KOSKI

IMAGINE yourself on assignment to Panmunjom as an interpreter at the truce negotiations! Or what would be your reaction on receiving orders detailing you to Teheran where a knowledge of the Persian language would be highly desirable if not essential, or to South America to teach radio communications in Spanish to a group of Peruvian soldiers?

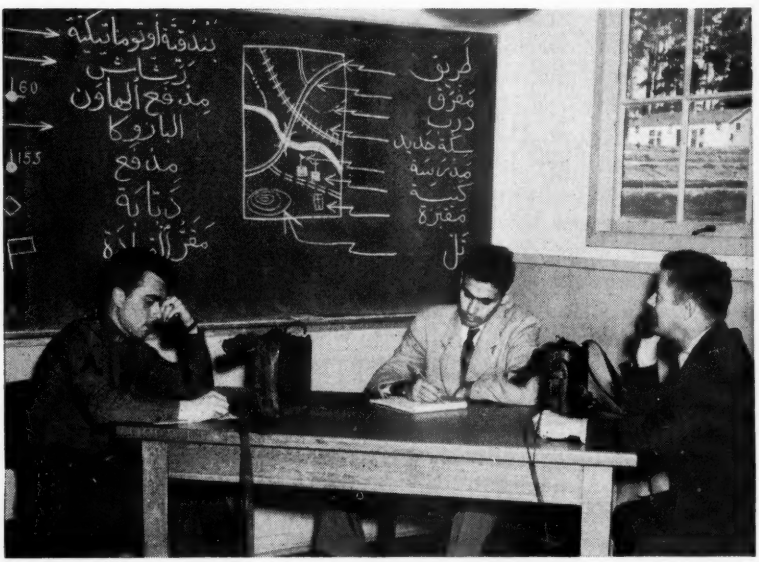
Ten or fifteen years ago it would indeed have been difficult to find qualified linguists to fill such assignments which today are not unusual in the Army and the Air Force. Yet native-born American servicemen and women with only an average educational background are currently performing these specialized functions with outstanding success.

Most of these linguists are graduates of the Army Language School at the Presidio of Monterey, California. This unusual service school, overlooking Monterey Bay and the Pacific Ocean one hundred and twenty-five miles south of San Francisco, was originally established in 1941 to train men for military intelligence work. During World War II students studied basic Japanese, military Japanese, the organization of the Japanese army and the technique of interrogating prisoners of war. Later other languages were added, until today the School offers courses in twenty-four foreign tongues.

These languages are grouped for administrative purposes into four divisions—the Eastern group with Chinese-Mandarin, Chinese-Cantonese, Japanese and Korean; the Middle-East-Slavic group with Albanian, Arabic, Bulgarian, Czechoslovakian, Greek, Hungarian, Persian, Polish, Serbo-Croatian and Turkish; the Romanic-Germanic group consisting of Danish, French, German, Italian, Norwegian, Portuguese, Rumanian, Spanish and Swedish; and finally the fourth group devoted to Russian exclusively. Courses vary in length from twenty-three weeks for

AUGUSTUS A. KOSKI is educational adviser to the Commandant, Army Language School.

A member of the Hungarian language faculty (left) and a student examine a display of newspapers of that country. U. S. Army Photograph



Students simulate combat conditions in the classroom, using field phones while practicing Arabic terminology. U. S. Army Photograph

languages in the Romanic-Germanic division to forty-six weeks for all other languages. In addition there is a special twenty-three week course in Russian offered to Air Force personnel.

The School also provides language training for selected students assigned under the Department of the Army Language and Area Program. Normally the initial phase of training under this program consists of one year of study at Army Language School for those students requiring such knowledge as a basic tool in their study of specialized areas.

The object of the interpreter courses is to graduate linguists who can speak fluently with a pronunciation approximating that of a native and who can readily understand a native speaking under normal conditions. Teaching methods differ from those used in most high school and college language classes. Instead of trying to master all of the rules of grammar and spelling first, students at Army Language School begin at the conversational level and learn the fundamental speech patterns through exhaustive oral practice and drill. By constant repetition, daily memorization, and intensive drills in various combinations of basic utterances, the student establishes gradually and firmly in his mind the basic structural features of the language under study.

From the moment he enters the classroom, the student leaves English behind him. He begins hearing and using such common expressions in the new language as "Good morning" and "How do you do?" By the end of the first day, he can answer simple questions and carry on a limited conversation with the instructor. Small sections of not more than eight students meet six hours a day, five days a week. Each afternoon the instructor introduces a new subject for conversation. The students continue their studies in the evening by means of phonograph records, first listening and then repeating the phrases and sentences.

Classroom work extends beyond the oral drill and exercises, however. Students see foreign language movies, listen to foreign language radio broadcasts, read foreign language newspapers and magazines, produce plays and skits in foreign languages and even sing foreign songs. Outside of class they visit foreign communities in the San Francisco area, eat at restaurants specializing in native foods, attend theaters and visit local festivities where they may hear the language spoken. Back in the classroom again, they study sand table models of native scenes and listen to lectures on the history, geography, social customs and racial characteristics of the countries whose lan-

guage they may be studying. Major emphasis is placed on foreign technical and military terminology.

Few textbooks are used during the course. With the accent on oral training, the School has never found a commercial textbook entirely satisfactory. When the need arises, text material is written by the instructors with the advice of educational consultants employed by the School. Most of the textbooks and printed material are prepared by the faculty and printed at the Presidio.

Of the twelve hundred students now enrolled, 60 percent are Army personnel and 40 percent are Air Force. They range in age from seventeen to fifty and in grade from private to full colonel. Some have been in the service less than a year, while others are professional soldiers with combat duty dating from World War I. Some lack a high school diploma, while others have satisfied all the requirements for a Ph.D. A typical class may include a WAC private with a master's degree in languages and a captain who neither went to college nor had any previous experience with a foreign tongue.

The School has been so successful in its methods that it can teach almost any student to speak a foreign language fluently if he is willing to learn, regardless of his past experience in languages. Failures average less than 15 percent of the total enrollment.

The fact that most students volunteer to attend the School keeps the percentage of failures low. In making application for training the student indicates his first, second and third choices among the languages he wishes to learn, but the final selection is based on the needs of his service. Sometimes a student who asked to learn Spanish finds himself successfully studying Chinese-Mandarin instead.

To be eligible for interpreter training, prospective students must be United States citizens and have a high school diploma or attain its equivalent in a General Educational Development test offered by the United States Armed Forces Institute. In addition, enlisted personnel must have a General Classification Test standard score of one hundred or higher in Aptitude Area III. Age limit for enlisted personnel is thirty-seven years (or not more than thirty-four if without prior service in the Army or Air Force). Enlisted applicants must have completed basic training and have fifteen months more to serve after graduation. Company grade officers must have twenty-four months of service remaining after graduation. Field grade officers may attend

A Spanish language instructor uses a sand table as a vocabulary-building aid in his teaching. U. S. Army Photograph

These records being cut by members of the School staff will be used by students in their language exercises. U. S. Army Photograph

the School when oversea orders indicate a requirement for a knowledge of a foreign language.

The School employs language teachers who only recently were using their native language in their daily life. The typical instructor has been away from his homeland less than four years and may have come directly to Army Language School from Europe, Asia or the Middle East. He may have been an instructor or professor in a foreign school or university. Others are former army officers, lawyers, judges, doctors, engineers, writers, poets and musicians. All of them are either natives of the country whose languages they teach, or, in one or two cases, Americans who have attended school abroad for a considerable period of time.

Although Army Language School is a service school, it has an academic atmosphere not unlike that of a university graduate school. Its record of achievement is highly respected in civilian educational circles and it is widely referred to as the largest and best language school in the world. The School is recognized by the American Council on Education and its graduates receive generous transfer credits at civilian colleges and universities.

However, the academic atmosphere does not reflect the prime mission of the School, where reading and writing a foreign language are secondary objectives. The School exists primarily to teach Army and Air Force students to speak and understand a foreign language in the shortest possible time so that they may serve more effectively in their relations with foreign peoples, wherever United States troops may serve.

There is no curb on competence in the Army. We are anxious to develop the abilities and stimulate the initiative of each soldier. We are anxious to give him a sense of individual opportunity. There is a challenge to every man to rise to the limit of his ability.

General J. Lawton Collins

PUSH-BUTTON WARFARE --AGAINST FIRE

CHARLES DEVORE

FLAMES leap up from a crashed aircraft on the flight deck of a carrier off Korea. They lick their greedy way toward other airplanes combat-loaded with napalm bombs, the highly combustible jellied gasoline. A press of a push-button sets the fire fighting apparatus into motion. Within nine seconds the Navy's new system is operating and in nine minutes the fire is entirely extinguished.

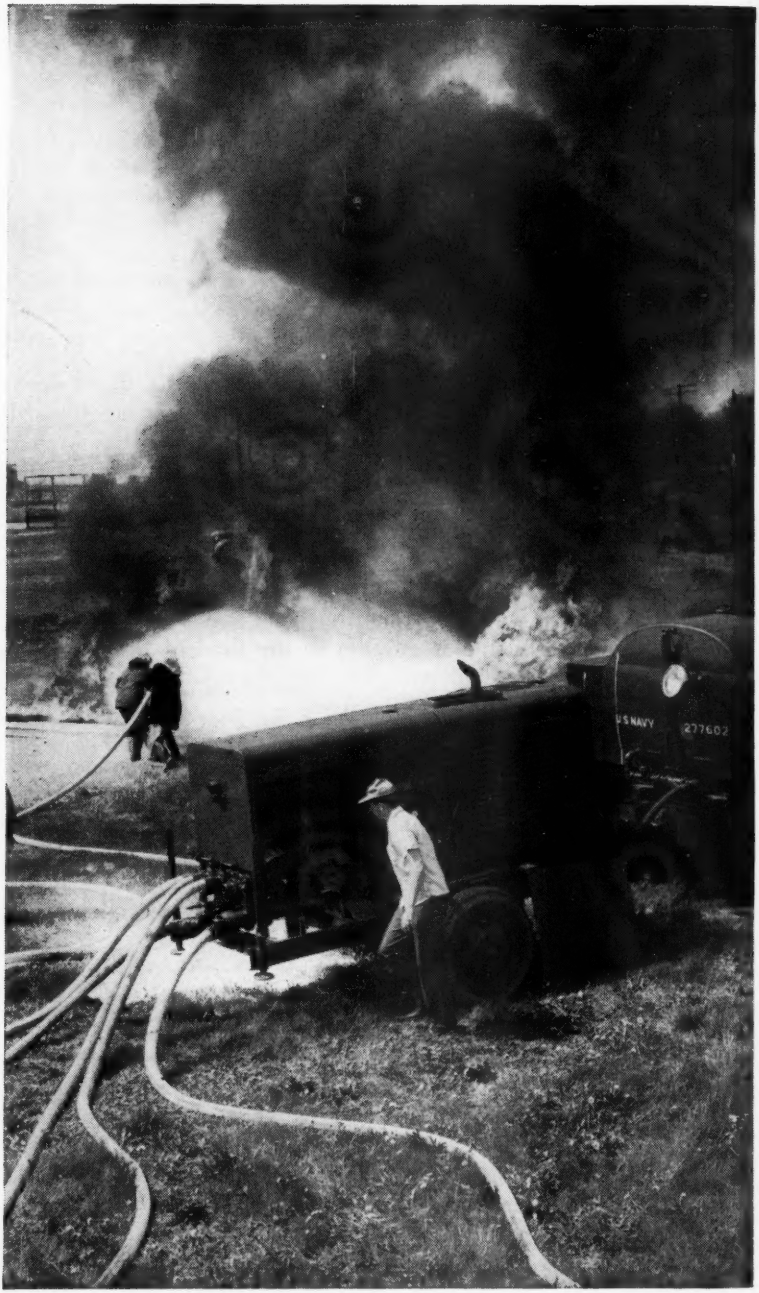
A widely quoted epigram contends that despite all the talk about push-button warfare, the only thing actually in existence so far is the push-button itself. Yet in the field of fire fighting, the Navy has developed at least one push-button *defensive* weapon—against oil and gasoline fires.

Belying still another familiar saying—that one should not combat oil or gasoline fires with water because the water will spread the fire—the Navy has actually developed oil fire fighting methods utilizing water and air. Even horn and hoof meal, fish scales, corn proteins and soybean meal are used in fire fighting; at least, some of the ingredients are "protein solutions" made from basic materials generally considered as foods rather than extinguishing materials.

The push-button method of fire fighting employs the high capacity fog foam system which is put into automatic operation merely by pressing a button which may be far from the actual scene of the fire. The method is now used not only aboard ship but for control of fires in large oil storage tanks.

Experiments in the chemistry and physics of fire extinguishment began at the Naval Research Laboratory as far back as 1929. In 1934 the Bureau of Construction and Repair of the Navy Department (later combined with the Bureau of Engineering to become the Bureau of Ships) requested the Laboratory to investigate the usefulness of mechanical foams for safeguard-

CHARLES DEVORE is Assistant Technical Information Officer, Naval Research Laboratory.



Fire fighters test Laboratory methods and equipment designed to combat large gas and oil blazes. **U. S. Navy Photograph**

ing the old carrier USS *Lexington*. Since 1938 much of the work at the Laboratory has been concerned with use of foams and other chemicals for combating oil and gasoline fires—an ever-present hazard in the Navy. Currently a completely equipped fire engineering laboratory, staffed with chemists and chemical engineers, devotes its entire time to the basic study of fires in these fuels.

Fire is the rapid oxidation of material—the combining of the material with oxygen through application of heat. It can be prevented by keeping heat away, or it can be extinguished by cutting off the supply of oxygen. The latter is usually accomplished by smothering the flames. The camper uses sand to smother his campfire; similarly blankets may be used in emergencies to smother flames. And while a stream of water is the most commonly used method of extinguishing a blaze, actually this tactic is not always effective. Water poured on burning carbides, for example, may actually produce a chemical reaction which generates more heat. Recent experiments have shown, however, that the same water converted to spray or fog can be extremely efficient in fighting fires since the fine spray has both a smothering and a cooling effect.

In combating gasoline and oil fires, various types of chemicals have long been used as smothering agents; these are either sprayed on the surface in the form of a fog or applied in a heavy stream. Then, if the remainder of the combustible material in the tank can be kept sufficiently cool and if fumes can be prevented from spreading, the fire can be kept out. Recent experiments with chemicals have shown that the surface fire can be smothered by an application of foam which extinguishes the flames and also prevents formation of explosive fumes or gases. In effect the foam forms a vapor-proof barrier that keeps the fuel from re-igniting.

But in actual battles against oil storage tank fires, the intense heat may prevent the fire fighters from approaching sufficiently close to apply chemicals in any form. Various methods have therefore been sought to install equipment which can successfully disperse the fire extinguishing materials in one form or another. In this country this usually took the form of a pipe running up the outside of the tank, from which the extinguishing chemicals could be sprayed over the surface of the inflammable material. In case of a tank explosion or an enemy bombing, however, the pipe might be destroyed or the heat of the fire might melt or otherwise damage the pipe. This hap-

pened frequently during mass bombings of London in World War II. The British therefore began experiments with a new method of injecting foam to the top of a burning tank by pumping the foam through the very same pipes used for intake of oil.

In 1942 the Bureau of Yards and Docks asked the Naval Research Laboratory to devote a portion of its program to the study of the chemicals and methods used for extinguishing large petroleum tank fires at shore and advanced base installations. Specifically it was requested that the Laboratory study methods of utilizing oil intake lines to introduce foam into petroleum storage tanks in case of fire.

In order to determine just how a mechanical foam could be injected into the bottom of a burning tank of fuel oil, rise to the top and extinguish the fire, a program of detailed laboratory investigation was launched. Study of bomb-blasted tanks in England and later study of burned tanks at the great Texas City disaster demonstrated that the intake pipes themselves were seldom damaged, as so often happened with exterior pipes or other equipment. The basic idea appeared sound.

After studying many hundreds of small-scale gasoline and oil test fires, Naval Research Laboratory scientists demonstrated that a mechanical foam could be injected into the bottom of a burning tank, rise to the top and extinguish the fire. What is more, they found that the water content of the foam first lowered the temperature of the entire tank, after which the vapor-proof barrier of foam put out the fire and prevented re-ignition.

Following the Laboratory studies, a full-scale test using British equipment was set up in 1943 at a Navy fuel oil storage depot near Penniman, Virginia. A test conflagration was started in a standard fifty-five foot tank container of bunker type fuel oil. The fire was allowed to burn for fifteen minutes, then foam was injected into the twelve-inch oil intake line. The fire was extinguished in seven and a half minutes. Incidentally, it was also demonstrated that the foam could be injected at a safe distance from the heat of the fire—in this instance six hundred feet.

Encouraged by the results, the Laboratory sought to adapt these principles to more hazardous fuels such as gasoline. An extensive program of research was begun to determine what characteristics the foam must have to be applied either by surface application methods or by subsurface injection methods. This study resolved itself into two logical phases—first, the study of the composition of the foaming agent itself and the characteristics of the mechanical foams produced by its use; second, the

development of foam-generating devices of the correct design.

The first study revealed that domestically marketed foam fluids available in 1943 would not put out gasoline fires by subsurface injection; but it was further discovered that addition of certain protein materials plus other ingredients would make the foam fully effective. The proteins now used are derived from such raw materials as horn and hoof meal, fish scales, corn proteins and oil-free soybean meal. Suitable antifreeze compounds and preservatives are added to the foam fluid to prevent freezing and deterioration during storage. This research project resulted in 1945 in the drafting of uniform joint Army-Navy specifications for foam fluid.

This mobile pressure-foam generator features an adjustable spreading nozzle designed for fighting petroleum fires. U. S. Navy Photograph

Tests of the new foam fluid were conducted in July 1945 in co-operation with the Standard Oil Company of Ohio. Fire was started in a ninety-three foot steel tank on a crude oil storage tank farm near Findlay, Ohio. The new foam extinguished the blazing crude oil. Then the same fuel was enriched with a ten-inch layer of gasoline on the surface. The time for extinguishing these fires varied from eight and a quarter to thirteen and three-quarter minutes, depending on the variables chosen for the specific test.

Having evaluated the foam fluid itself, Naval Research Lab-

oratory scientists turned their attention to the practical considerations involved in this type of fire protection. Standard test methods were developed for rating the foams and a special kit was devised for use aboard ship, at shore stations and at crash fire-fighting installations in all of the armed services.

In co-operation with civilian industry, the Laboratory went on to perfect an entirely new foam generating and pumping unit for the Bureau of Yards and Docks—the first motorized equipment to be engineered specifically for fighting oil and gasoline fires. The apparatus consists of a triple pump unit powered by a two hundred horsepower motor. It can deliver up to two thousand gallons a minute of wet, fire extinguishing foams at line pressures of sixty pounds per square inch. The apparatus can apply foam to a large tank fire either by surface application or by the subsurface injection method. A special adjustable nozzle, also designed by the Laboratory, provides for delivery of the foam in a straight stream over long distances or in a protective cone-shaped curtain, depending upon the conditions of the fire.

This new development was followed by the re-design of piped foam systems aboard aircraft carriers. The new system uses water from the fire mains of the ship, mixing it in just the correct proportion with foam liquid. The resulting solution is piped to strategic hazard areas throughout the ship. Then at the touch of a push button, both portable and stationary fog-foam nozzles produce either solid, cohesive streams of fire-smothering foam or the large "snowstorms" which protect areas of hundreds of square feet.

Today, so far as is known, the Naval Research Laboratory is the only installation in the country carrying on this type of research to such an extent. But since the control of fire is not merely a Department of Defense or a Navy problem, Laboratory scientists have been active in sharing their knowledge with such policy making bodies as the National Fire Protection Association, the American Petroleum Institute and members of the petroleum industry interested in safety problems. They also have co-operated with research workers in Sweden, Great Britain and Holland. Thus the Naval Research Laboratory's study, originally conducted primarily for military purposes, is proving of lasting benefit to private industry for peacetime applications.

San Juan Hill

One of the popular misconceptions to come out of the Spanish-American War is that Colonel Theodore Roosevelt's Rough Riders charged up San Juan Hill on horses, with bugles blowing and banners waving. Actually the credit for the capture of San Juan Hill must go to them as dismounted troopers fighting as infantrymen. The units which engaged in this much publicized action in Cuba on 1 July 1898 had left their horses in the United States due to the lack of transport space. They struggled up the hill on foot and, as the historian William A. Ganoe chronicles, "The Rough Riders really became dogged walkers."

With the Rough Riders in the assault were the 1st and 9th Cavalry and part of the 10th Cavalry. Following initial confusion and hesitation on the part of some volunteer units, the 6th and 16th Infantry Regiments deployed along a thicket six hundred yards from the Spanish defenses. After a long wait during which fairly heavy losses were sustained, the 9th and 13th Infantry Regiments came into line. At last a battery of Gatling guns was brought up and, although at first it drew the heaviest Spanish fire, it finally moved into a position where it could open up on the ridge ahead.

The Spanish defenders were seen to waver and some to flee, and the order was given for the charge. From one side the United States infantry, from the other the cavalry, burst into the open and struggled up the hill—with no little interference from the fire of their own artillery in the rear—and a final rush brought them to the enemy fortifications. The Spaniards were already down the other side, in the valley beyond. San Juan Hill was in the hands of United States forces.

The scene on the back cover depicts the charge of the Rough Riders at San Juan Hill as painted in 1899 by Frederic Remington.